The Earl of Charleville
Pres. Royal Irish Academy
&c. &c. &c.
[redacted] the Author
respectful compliments.

SOME

OBSERVATIONS

ON

CONSUMPTION,

SCROFULA OR KING'S EVIL,

GOUT, ASTHMA, SOFTNESS AND DISTORTION OF THE BONES, RICKETS, CANCER, INSANITY,

AND OTHER

CHRONICAL DISEASES;

WITH

REASONINGS

ON THEIR

Remote Origin, probable Affinity, and Means of Prevention and Cure:

IN SIX CONSULTATIONS.

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TO

WALTER WADE, ESQ.

F. R. S. M. R. I. A. L. S. &c. &c. &c.

HONORARY FELLOW OF THE KING AND QUEEN'S COLLEGE OF PHYSICIANS IN IRELAND;

PROFESSOR AND LECTURER ON BOTANY

TO THE DUBLIN SOCIETY,

AND

ROYAL COLLEGE OF SURGEONS,

IN IRELAND,

MY DEAR SIR,

The obliging attentions which were so frankly offered to a stranger, known only to you as a fellow labourer in science, awakened a natural gratitude to the father of Irish Botany, which continued communication has confirmed into friendship.

That I have chosen to put my thoughts into a colloquial form, though it may appear somewhat singular, is by no means very new. The learned professor Brasavolus, of Ferrara, wrote his commentaries

on Hippocrates and his other works, in a supposed dialogue between himself and an apothecary. One of the most instructive works, even in the caustic study of the law, is the dialogues between the Doctor and Student. And who that has read the piscatory eclogues of Walton, does not acknowledge, that the delight he has experienced arises much from the pleasing flow of familiar conversation between himself and his friends.

In the form either of communication or consultation, most of these ideas were first elicited; and in this shape I have adventured to exhibit them, as more open to discussion and the detection of fallacy.

The importance of a subject, so highly interesting as the investigation of those slow and morbid actions of the human frame, constituting the great mass of chronical diseases, will perhaps be more readily admitted, than that it has been happily executed. The why and the wherefore is now an object of every man's consideration; and he that presumes to offer didactic information in any department

connected with science, is supposed to be always ready to give an answer to him that asketh.

Plausible pretensions, like the thin coating of base coin, so nearly resemble the genuine bullion of science, that they frequently acquire a facility of currency, and are not easily detected by the rapid transfusion necessary to common knowledge. "The toe of the peasant," says Shakespear, "approaches so near to the heel of the gentleman, as sorely to gall his kibes."

Physiology is to medicine, what metaphysics is to general science; that precision which enforces conviction by producing demonstration. To examine and explain the simple laws of animal composition is the business of the chemist: to apply their collective results to the removal of disease, or the aberration from that chemical consaniety which supposes health, is the office of the reasoning physician. The accumulation and appropriate application of these facts and their corresponding connections and relations, form what may be denominated physical wisdom.

It was the usual observation of your noble countryman, Boyle, one of the founders of experimental chemistry, that if every artist would but discover what new observations occurred to him in the exercise of his trade, philosophy would thence gain innumerable improvements.

Nulla dies sine lineâ, was the motto which the founder of systematic botany assiduously endeavoured to impress upon the minds of his disciples. The possession of any new certainty advances the human mind in the gradation and dignity of a thinking being: and even a dwarf, says Sir Walter Raleigh, when seated on the shoulders of a giant, can see something more than the giant himself.

Whatever of error, either in chemical or physiological reasoning, may be found in the following suggestions, myself am alone accountable for: and I offer them to the examination and correction of such as may be numbered inter clariores et digniores.

Receive them, then, with that liberal indulgence, which men of true science well know must necessarily be allowed in the discussion of subjects which have hitherto eluded all research, and are yet involved in the darkest shades of obscurity and uncertainty: and allow me the honour to announce myself,

Your sincere and faithful friend,

WILLIAM TURTON.

Dublin, 7, Great Ship-st.
Septer. 2nd, 1813.

SOME OBSERVATIONS

ON

CONSUMPTION.

CONSULTATION. I.

B. Of a disease almost always decidedly mortal, we can only prognosticate the most melancholy consequences. This is that genuine pulmonary consumption, which in its present advanced stage, has foregone all reliance upon the powers of medicine, except such as may allay and soften occasional sufferings, and sooth the few remaining pangs of mortality.

A. A long and watchful attention to the growth and progress of this afflicting and generally hopeless malady has, I must confess, left no very satisfactory impression upon my mind, of our advancements in the knowledge and treatment of this and some correlative diseases. From the valuable tables of Dr. Woolcombe, it

appears, that the relative mortality from pulmonary consumption has been regularly increasing during the last century, taking into proper calculation the enlargements of population. Consumption, I allow, is too loose and indefinite a term, and apt to be indiscriminately applied to all who die of a lingering disease, in a pale and emaciated condition: but accurate nosologists will carefully draw a diagnostic difference between the wastings of marasmus and atrophy, and the emaciation from real pulmonary affection.

B. The remote causes of physical evils are ever clouded in deep obscurity; and where demonstration is wanting, theory must lend its aids. It is in the aproximation of these two powers, that hope ripens into confidence, and produces something like certainty.

A. Theory is the speculative knowledge of genius, leaving to sober wisdom its practical uses. And where shall we find that theory which has yet conceived, or that wisdom which has yet applied either help or solution to the difficulties with which, in these cases we have to encounter. You know the old reproach to this lingering and tedious department of our art.

B. Our abstract knowledge of chronical complaints is confessedly imperfect. We can as yet therefore only take the aggregate information which has been already supplied to us; and act by materials, the powers of which we are better acquainted with.

A. Is not this what logicians denominate ignotum per ignotius? And do we not upon this principle apply means, of which we know something, to causes of which we know little or nothing? And if the foundations of knowledge be laid in uncertainty, how shall the fabric stand!

B. Science is always progressive. The mind of man is too active to remain contented with its present stock of knowledge, but is eagerly searching for the enlargement of its range: and so long as language has been formed to utter the thought, complaints have not been wanting of the imperfection of existing attainments.

A. Too eager a pursuit in the developement of the laws of nature, is often apt to hurry us into the wilderness of confusion and error, by wandering beyond the paths of simplicity and truth. A motive for perseverance however, still more noble than the mere appetite of curiosity presents itself to the benevolent mind, in the

hope that patient investigation and research will in some future time reward the diligence of inquiry, by a disclosure of the remote foundation of many of those disorders under which the sufferers are doomed to pass a portion of their existence in lingering and hopeless misery. And whosoever adds one fact or one probable thought by which reasoning and experience may be guided to this end, has done that duty for which he was placed within the circle of science. The plague, the jail-fever, the sweating sickness, and the small-pox, have yielded up their malignity; and it is not the mere reverie of the study to believe, that if much has been done to-day, something more may be done to-morrow.

B. If the insulated situation of the inhabitants of these kingdoms, subject to such abrupt variations of climate and degrees of heat, cold, and moisture, be a pre-disposing cause, as is much supposed, it does not seem within the probable powers of art or application to give general relief, or hope for general eradication.

A. An inquiry among our neighbours will by no means justify us in the common conclusion, that this disease is more peculiar to our own climate, or depends upon the influence of local situation. The whole of Germany, Austria, and Switzerland is subject to the ravages of this dis-

ease, in equal proportion with the inhabitants of the British Islands: and it appears by the most authentic registers from Vienna and Berlin, that the average number of deaths from consumption, is a fifth part of the general mortality; a proportion which equals, if not exceeds that of London. And although we have not the same accurate returns to form comparative estimation of France, Spain, America, and other climates, we know sufficiently that they are by no means spared from its destructive influence.

B. Most of those who have written upon this gigantic malady have agreed in the principle, that it originates generally in a peculiar malformation of the body, a disproportion between the capacity of the lungs and the rest of the frame. And what skill, or what knowledge can undertake to rectify the aberrations of nature, or make that perfect which she has, ab origine, formed wrong.

A. This is, I think, presuming more than we have a right to suppose, and taking as a gratuitous position what is at last mere doubt and uncertainty; quenching at once the ardour of investigation and the hope of success, by placing before them the impenetrable bars of impossibility. There are many reasons which induce me to question the truth of the fact itself.

B. Are we then to consider this peculiar formation of the frame, so strongly marked in this disease, rather as a symptom than a primary cause?

A. Error is often traditional and hereditary, from the easy solution it gives to common difficulties. We are too apt to take effects for causes, and by confounding mere symptoms with their efficient excitements, to stop short of effectual means, and to attempt alleviation rather than radical cure. I have often carefully noticed the commencement of this malady in families, the subjects of which I have known from very infancy, and have always remarked them to be of the most perfect shape and make: and this delicacy of frame; this emaciation of the muscle, producing the long neck, high shoulders, prominent cheek-bones, narrow chest, transparent hands, and other well-known signs, do not make their appearance till the disease has advanced a decided and visible stage. If original disproportion of structure were the basis of these effects, the outline would be so determinately marked in the ealier stages of life, as to give very little credit to the sagacity of prognostication. Let me again repeat the observation, as tending to much importance if it be founded in truth; that the victims of this disease have no original misformation of frame, no dispro-

portion of structure in their infancy or childhood. And mothers who anxiously watch over the increase and growth of their children, well know this, but are often doomed to see the fairest and most perfect of their offspring, both in personal and mental endowments, fastened upon by the fangs of this inveterate and calamitous affliction.

B. A little recollection seems to convince me of the jutness of your remark. Large families are often almost wholly swept away by this disease, in the happiest season of life, who in their infancy and childhood have been models of all that could be perfection in the formation and symmetry of their persons, and the ingenuity and docility of their minds. I think I have never seen an ugly, nor a foolish, nor a wicked person in genuine consumption. Accidental causes may nevertheless tend to its production; such as absorption of purulent matter from long continued abscess, the rupture of a blood-vessel, incautious exposure, thin clothing, indulgence in irregularities of appetite, and some others.

A. Extraneous circumstances, like the accidents you mention, may doubtless, by producing inflammation of the lungs, or exciting into action a pre-disposition to this affection, superinduce all their mischievous effects. Still that pulmonic consumption which is the object of our

present research, seems to be quite independent of those accidents, and to commit its ravages in despight of all that solicitude, precaution, and the most anxious attentions can oppose to it. A deeper cause therefore, I am apprehensive, remains to be sought for, before we can fully comprehend its remote causes, and address ourselves to its cure with any probable hope of success.

B. Attention has been early awakened to the mischiefs and miseries of this disorder, and all the avenues of information have been diligently searched for their relief. Where are we then to apply ourselves for the solution of those difficulties, which as they have hitherto been unconquered, seem unconquerable?

A. This reasoning seems to be something of the argumentum ad ignorantiam. We know very little about it, and therefore very little about it is to be known. Prejudice and fear are the common obstructions which present themselves to the pioneers of science. Prejudice is the determination to abide by ancient opinion, whether right or wrong: and fear will paralize those who are cautious of what they do not fully understand, and about which they are unwilling to make inquiries. If I look forward with any degree of confidence, it is to the natural alliance always existing, but as yet imperfectly connected,

between chemistry and medicine. Man, quatenus his bodily frame, is a mere chemical machine, producing mechanical action, subject to the same varieties of combinations, affinities and deductions as all other chemical agents. His nobler attributes are distinct, and beyond the reasonings of the mere physiologist, and if his individual component parts consist of materials purely chemical, in the aggregate he becomes the object of the various laws and powers of chemistry.

B. It has been much a subject of doubt, with what safety the powers of chemisty can be relied on in aid of the reasonings of the physician. Many men of justly acquired celebrity, look with a degree of suspicious caution upon too close a connexion between these two branches of science, as leading to dangerous discussion and uncertain support.

A. Two descriptions of learned men I have casually found, slow in admitting the necessity of this connexion: the physiologist who has not considered the science of chemistry as an essential part of his studies; and the chemist who understands as little of physiology. The pharmaceutic materials of the physician are nevertheless, compositions abstractedly chemical; and the extemporaneous combinations of these

materials in prescription, ought to suppose no slight degree of knowledge in the science: and this knowledge must include not only their specific and appropriate powers, but an acquaintance with their destined operations and effects. The healing an ulcer, or the management of a typhus fever, are processes as decidedly chemical as the lighting a fire. So early as the days of the great Lord Bacon, it was observed, that from the furnaces of the chemist had arisen a new philosophy, by which were confounded all the reasonings of the ancients. And this philosophy, which in process of time has pervaded and influenced all the departments of science, has also in its proportionate degree illuminated that of medicine.

B. Many of the animal functions are however much independent of external causes; and many of the principal organs internally concealed, as if withdrawn from the influence of extraneous powers, and therefore the less connected with the empire of chemistry. It is consequently the duty of the considerate practitioner to be highly cautious in the application of its laws to many of the phænomena upon which the principles of life essentially depend.

A. The misapplication of powers by no means supposes their inutility, or precludes their uses. The abuses by which, in the early stages of che-

mistry, the bold and imposing empyric sacrificed the interests of science, and endangered its safety, have rather suppressed the confidence of sober men in its application than destroyed its virtues. To the diligence of modern chemists we owe the solution of many of the phænomena of animal organization, and the functions of vitality. The doctrine of gases has now first opened to our view the theories of respiration, animal heat, and the causes of mephitic airs and epidemic fevers. And if not to chemistry, where can we inquire into those disarrangements of the animal system produced by the aggregation of calcareous substances in various parts of the frame?

B. All the materials of nature are strictly chemical agents, combinations of elementary principles, arrranged for certain ends, and producing their certain and intended effects. And with the intention that the results of the laboratory be subservient to the views of the physiologist, there can be no doubt but that the knowledge of chemistry is laudibly applicable to the animal economy; and that the skill of the physician may obtain much illustration and assistance from this great auxiliary.

A. And as every variation from the usual chemical laws of nature, produces new affinities and new combinations, so the aberration of these

laws, as applied to animal functions, must produce that organic alteration which generates disease. It is in a knowledge of chemistry therefore, that we must seek for a developement of many of these causes, and for a proper and safe correction of their effects. And as the progress of the latter gradually unfolds the awful veil of nature, the application of its known laws and powers must practically assist the former. It is to their alliance that we must look forward to any considerable advancements in the doctrine of physiology, and the knowledge of morbid actions.

B The aids of chemistry have not been wanting to these ends, and more especially in the disease which is the subject of our present discussion. Beddoes, Watts, Thornton, Darwin, and some other names of honourable memory, have enlarged the limits of our knowledge, by opening to our views the resources of their connexion, and the means of their application.

A. Beddoes by the lights which Mayo and the fathers of modern chemistry have thrown upon the theory of respiration and gaseous influences, has questionless advanced a step within this enchanted circle. But here he seems to have stopped. Beddoes, by the discovery of the importance of oxygene to many of the animal

unctions, has upon this foundation erected a theory, applicable indeed to some points of this interesting subject, but by no means to all its appearances and symptomatic varieties. Finding that oxygene gave the florid colour to arterial blood, and that this oxygene was delivered to the lungs by inspiration, he reasons thus. Excess of this oxygene is the cause of the irritation and consequent ulceration of the lungs: take away or reduce this excess of oxygene, and we remove the cause; consequently we cure the disease. And finding the inspirable air of the atmosphere to consist of certain proportions of oxygene gas and nitrogene or azote, thinks he has a ready instrument for his purpose, by altering the proportion of this mixture, and causing to be inspired an air charged with a lesser degree of oxygene. To effect this, means were contrived, and ingenious instruments constructed for the administration of the various gaseous fluids in their different state of purity, and mixtures of alloy and reduction.

B. This doctrine is of such simplicity and the structure so beautiful, that I shall feel a kind of humiliation in finding it founded in error. But the experience of more than twenty years will not allow us, I am afraid, to justify his hopes and admit his conclusions. The premises are nevertheless not altogether inadmissible: for the

fact cannot be denied, that oxygene is necessary to respiration, that the blood owes its florid colour to its union with the oxygene so inspired, that in consequence of this union, heat is generated, and that by the continual administration of this gas to the lungs, a focus of heat is established, which in its excess may produce that degree of combustion sufficient to account for many of the phænomena of consumption.

A. As far as the simple process of combustion and its effects are concerned, I readily concur with the illustrious author and the supporters of these opinions, that oxygene is a primary agent. But it by no means explains to us the remote causes of this susceptibility of hyperoxygenation, nor some consequent singular phænomena, always in a greater or less degree connected with it.

B. Even in discussion and the detection of error, important truths are often elicited. See how in support of a favourite system, men labour to arrive at the same end, but by opposite means. The celebrated Chaptal refers to the observations and experiments of his friend Mr. Caillens, for the great success with which persons affected with phthysical disorders have inspired oxygene or vital air, and he declares himself to have been a witness of its most wonderful effects in a similar

case. A friend of his was in the last stage of a confirmed consumption, with extreme weakness, profuse perspirations, diarrhæa, and every symptom of approaching dissolution. He was put upon a course of vital air, and inspired it with delight, seeking for it with all the eagerness of an infant at the breast. During the time of inspiration, the patient felt a comfortable glow diffusing itself through all the limbs. His strength increased with great rapidity; and in six weeks he was able to take long walks. This state of health lasted six months: but being no longer able to have recourse to this air from some accidental circumstances, he relapsed and died. And though Mr. Chaptal expresses a doubt whether this powerful air be a specific in cases of this nature, yet in the conflict of two such great and contradictory opinions, where shall we turn for confidence and decision?

A. Both may be particularly right, but it is probable that both are generally wrong. Both take oxygene alone as the efficient, and upon this assumption found their facts and their deductions. One says, excess of oxygene is the cause, acting so as to exhibit certain well known and established effects. The other contends that deficience of oxygene is the cause, as appears from the benefits arising by its administration in a higher state of purity.

B. The case recorded by Mr. Caillens was probably in that advanced and hopeless stage, where great debility of the lungs, and prostration of muscular strength had taken place; where the usual stimulus of the atmospheric air was insufficient for the purposes of easy respiration and the renovation of health, and where a dose with a larger proportion of oxygene, acted as a present cordial, and gave temporary relief and vigour.

A. By taking oxygene alone as the agent, these great philosophers have founded all their conclusions. Their reasonings have been merely upon the plus and minus of this great power, instead of considering the various animal materials with which it may enter into relative combination, and the changes and effects which must consequently ensue. A large quantity of oxygene is no doubt inhaled, as appears by the short breathings, the hurried pulse, the dry hot skin, and the eager gaspings for large quantities of atmospheric air. The same circumstances take place in every fever, where the animal heat instead of being conducted by the pores and cooling the body by the evaporation of perspirative moisture, is superabundantly accumulated, causing anguish and distress in the organs of respiration. But these seldom produce cough, expectoration, and all the train of symptomatic evils

attendant on true pulmonary consumption. Oxygene per se, in its most simple and uncombined state, I consider, like all other substances purely elementary, perfectly inert and inactive, and incapable of bringing forth its powers till it has entered into combination with some other chemical body to which it has affinity. The component parts of the atmosphere seem to be a mere mechanical mixture, that is, producing by their combination together, no new power; but each separate part, particularly the oxygene, is ready to detach itself and enter into chemical union with whatever bodies it may have a greater affinity. Thus, in the burning a candle, the oxygene of the circumambient atmospheric mixture is disengaged and consumed in combustion.

B. This is an assertion which I must confess, is quite new to me; and if it be established by incontrovertible facts, will not only tend to overthrow opinions and doctrines already acknowledged as founded in true philosophy, but discover new points and new grounds for the reasoner in chemical physiology.

A. Let me be clearly understood, that if my philosophy be founded in error, it may be readily brought to detection and refutation, and be prevented from creating that confusion ever attendant on unsound hypothesis. By no known ex-

periments, nor by any known facts, can I as yet ascertain, that oxygene has any powers or activity in an uncombined state; but in union with many other substances we know that it readily parts with its active material, or caloric. Combustion cannot take place without the presence of oxygene. By the ignition of combustible matter, oxygene is readily absorbed; and in contact with many of the simple combustibles it is enabled to fulfil its precise and certain effects. Beddoes has frankly confessed the supposition, that some unknown cause must have enabled the lungs to transmit, or the blood itself to attract a superabundance of oxygene; a too rapid combination of which may produce inflammation and gangrene. The whole of animal life is a beautiful illustration of the theory of what is termed spontaneous combustion. To effect this, two distinct powers must enter into union, each of which in an uncombined state would be dormant: a substance combustible, and another capable of supporting combustion.

B. The supporter of combustion and heat we readily find in the oxygene of the atmosphere; but where shall we look for that combustible material in the animal frame able to bring into action these powerful combinations.

A. The decomposition of oxygene, and the consequent disengagement of its caloric or heat, we know may take place in two ways; by a body already ignited, or by its affinity with one of those bodies denominated by chemists simple combustibles: in both which cases, the attachment of the oxygene to this combustible is greater than to its own caloric, from which it is disengaged to form this new combination, producing at the same time combustion and heat. The first of these, or ignition, is out of the question in our present inquiry, as it supposes a material absolutely in a state of inflammation within the frame, ready to absorb and decompose the oxygene exposed to it. We must look therefore to some component part of the animal machinery, in which it may be reasonably made to appear, that these natural phænomena can be excited into action.

B. The solution of this problem will I acknowledge, open new scenes and disclose new views in animal chemistry; and bring into closer alliance these noble sisters of science. Phosphate of lime and carbonate of soda appear to be the ultimate products of animal matter, which acted upon by an inflammable principle may be the basis of animal life.

A. In a further discussion of these and some other circumstances analogous to the object of our immediate attention, we will venture to look further into this obscure but highly interesting subject.

CONSULTATION. II.

B. There are certain appearances usually attendant on this disorder, which though they have been glanced at by some few who have described its progress, are not considered as material and essential symptoms. Among these is the formation of stony concretions in the body of the lungs. The existence of so formidable an accretion in the principal organ of vitality, and found only in these cases, must awaken in a thinking mind a desire to investigate the causes of their formation, and how far they may contribute to the remote excitation and advancement of the disease.

A. All the symptomatic attendants of a disease whose actions are internal, do not always visibly exhibit themselves; or their presence may not happen at moments convenient for the de-

tection and examination of professional attendants. But that such concretions are frequently, perhaps very generally, formed in the lungs of consumptive persons during the progress of the dsease, and are actually expectorated in the very last stages, there cannot remain a doubt. This circumstance so very singular, and of so great importance in forming a reasonable plan of the doctrine of its causes, has been very superficially mentioned, but I think, no where attempted to be accounted for.

B. Of so little consideration has this been thought worthy, that even their very properties and composition have not yet been the subject of examination, either of the chemist or the physician.

A. Many of these have fallen under my observation, and could not fail to become much the object of my thoughts. I have now by me specimens of various sizes, from that of a large pin's head to that of a pea, and from one to four grains in weight. The largest I possess were expectorated by the lady of Captain Symes, of Brynhavod in Carmarthenshire, in May 1811, at that time in a rapid decline, and a few months before she died. They are all of similar appearance, and all produce the same results under accurate examination. The colour is of a grayish

white, when first expectorated and cleansed from the mucus with which they are invested, which by exposure to the air gradually changes to a clear white, like bones when they are bleached. The surface is irregular and of a rough appearance, with the outward angles generally polished, as if worn down by attrition. The substance is nearly as hard as ivory, or bone deprived of its moisture. When placed on a heated iron in the dark, they exhibit the most beautiful iridescent colours of yellow and greenish shades, especially when fresh. In fact they are a perfect phosphate of lime, or genuine apatite, gradually and slowly formed during the existence of the disease.

B. The presence of such substances in an organ so impatiently irritable as the lungs, must doubtless give occasion to many distressing feelings, and induce many dangerous symptoms. We well know what anguish and alarm is created by the accidental falling of a morsel of food, or the smallest extraneous substance into the trachea or passage to the lungs.

A. This, among other circumstances, may help us to a satisfactory explanation of the blood which is more or less usually expectorated; of the continual and teasing cough, and the origin of those tubercles eventually causing ulcers,

which at last never fail to destroy the sufferer. The gradual accumulation of hard, bony, angular substances within the lungs, must sometimes occasion the rupture of blood-vessels, pains in the side, laceration of the parts, the formation of ulcers, difficult to heal in consequence of the continual presence of their exciting cause, and the anguish accompanying the throwing off gathering mucus by violent coughing; and although the presence of these bodies are not always detected, I suspect that they are always in existence in some of the stages of formation, and that the latent and remote cause is ever present.

B. The pathology of these tubercles is yet very obscure, and medical writers are much divided in opinion, whether they should be considered as a cause of pulmonary abscess, or an effect of previous inflammatory disarrangement.

A. Dr. Jenner has suggested a hint whether these tubercles may not be collections of hydatids invested in their several integuments, which upon being ruptured produce ulceration. Darwin says, " that the immediate cause of pulmonary consumption consists in ulcersof the lungs, arising either spontaneously or from previous affection, which may vary with respect to their seat, as well as the remote cause: and supposes their immediate cause to consist in the irritability of

either the lymphatic or venous system, by the mucilaginous fluid poured into the cells of the mucous membrane not being perfectly absorbed, or the rupture of some of the small arteries investing the internal surface of the bronchia, inducing hæmoptoe and consequent ulceration."

B. This reasoning seems to labour of much abstruse learning, but neither the presence of simple oxygen in whatever excess, nor the conjectures of these and other learned practitioners, can afford any satisfactory solution of these extraordinary accumulations. Some hidden and undiscovered process of animalization must therefore be sought for, before we can account for this great and desirable arcanum in the human frame.

A. The accumulation of bony matter in various parts of the body is by no means rare. The museums of the curious exhibit many valuable specimens illustrative of this doctrine: and Dr. Baillie in his morbid anatomy, has enumerated many singular appearances of this kind. Occasionally it has been found that a portion of the pia mater of the brain has been converted into bone. Bony tumours in irregular masses are sometimes formed in the cranium, pressing upon a part of the brain. The membranous coat covering the pineal gland is often filled with calculous concretions, and the web-like coat often gritty.

It has sometimes happened that all the bones of the skull become thickened, and by their growth have encroached upon the cavity of the brain. Nodules having the appearance of pieces of ivory have been found in the bones of the cranium, protruding considerably into the cavity, and forming a permanent cause of compression and head-ache. Irregular bony ridges are frequently formed upon the inner surface of the basis of the skull, which by their morbid growth and accumulation form sharp edges running into the brain, necessarily occasioning violent head-aches and irritation of the nervous system. Ossifications take place in almost every part, and even over the whole body, as is seen in the relict of Clark, now in the anatomy house of Trinity College. Concretions have been found in the stomach; but these appear to be biliary, conveyed from the duodenum into the stomach by an antiperistaltic motion of this part of the small intestines.

B. In infancy and childhood the appropriation of osseous matter is palpable enough; but in the more advanced periods of life, it must either be absorbed and passed through the system in various ways, or by being partially retained, form extraneous and diseased accumulations. M. Roering observed that gouty men expectorate concretions, which upon examination appear to be phosphate of lime.

A. That it is in continual readiness for secretion at every period of life is evident, from the facility with which the broken bones of old men unite, even at the great age of fourscore and upwards; and in compound fractures, where a portion of the bone is either lost, or removed by the surgeon to facilitate his intentions of cure, a sufficiency seldom fails to be supplied to make up this accidental defect; and as if nature were willing to make assurance doubly sure, and to give enough and to spare, an elevated ridge is formed at the point of union, like the soldering of a brazier, making that part of the limb stronger and firmer than it was before the fracture.

B. Hence we see a reason for the gradual and accumulative ossifications in the latter part of life, when the trunk and the limbs become rigid by a conversion of the cartilage and ligaments into bone; and by the apex of the heart becoming occasionally bony, and causing the formidable disease called angina pectoris.

A. The arteries themselves at length become clogged with the matter of ossification, which impedes and retards their action. This is one of the principal causes of natural death. The volume of the arterial system is contracted, and much of its elasticity lost; the blood is chiefly

confined to the veins, as is visible in the turgid hands of old persons: whence the slow and unequal pulse, and the cold and debilitated extremities, till at last circulation is performed in too languid a manner for the necessary animation of the lungs, and complete exhaustion takes place.

B. It is probable then, that these concretions take place in the very early stages of the disease, and grow larger by slow accumulation.

A. Perhaps not, in their completely hardened state. The conversion of the materials of phosphate and carbonate of lime into osseous substance, I suspect to be more rapid than is generally supposed. The eggs of birds are covered with this bony crust, instantaneously upon their coming in contact with the atmospheric air. Before exclusion they are in a soft state and clothed with a mucus, which on exposure to the atmosphere is immediately converted into a bony covering: we frequently cut up fowls filled with eggs of various sizes, but all of them with a soft covering. The shells of crustaceous animals, as crabs and lobsters, and which they cast off every year, leaving the body soft and naked, are reproduced and hardened in a very short time. Fishermen sometimes take them in the soft state, and inform me that a very few hours are sufficient

to harden the crust. Navigators also know, with what dangerous facility the vast reefs of coral rocks which invest the shores of the southern ocean are accumulated, all these substances are either phosphate or carbonate of lime, and analogous to those formed in the human body.

B. Those calcareous concretions which are known in the shops by the name of crabs'-eyes, but which are found in the stomach of this tribe, and formed during the painful process of casting off the old shell, and disappear as soon as the new shell is sufficiently hardened. They seem to be accumulations secreted for this express purpose, and after their formation in this indurated state, are re-absorbed and carried to the surface, to furnish a new crustaceous clothing. During this time these animals are pale in colour, languid, and apparently much disordered; and at this time they creep into crevices of rocks left dry by the recess of the tide, for the purpose of exposing their bodies to the atmosphere, which may be necessary to complete a rapid induration.

A. Then the tardiness in the formation of internal bone arises from the circumstance, that oxygene is slowly administered, either by circulation or absorption. And I should suppose that the calculi expectorated from the lungs of consumptive persons, however they may be collected,

are at first in a soft state, and not hardened into bony matter, till the ulceration has so far advanced as to give a greater exposure to the action of the air. This may therefore account for their being found only in the last stages of the disease, and the small number which are found in the lungs upon dissection.

B. Our present knowledge of analytical decomposition is in very considerable advancement; but the doctrine of synthetical composition is merely emerging from darkness and obscurity. The modern philosopher can readily resolve a composite substance into its integral and elementary parts. But where is he that can gather together the abstracted and diffused particles of known substances, and reduce them to materiality and nominal form? For then would the dreams of the alchemists of old be more than realised, by the production of the precious materials of commerce from their bases, instead of the pretended transmutation from a baser into a more noble metal.

A. Those meteoric iron stones which occasionally fall from the clouds, are perhaps formed by sudden synthetical composition. The explosion of the vast iron works at Colnbrook was instantaneous, probably occasioned by confined steam. All was in a moment reduced to elementary prin-

ciples, leaving only some scattered portions of soda. And if by the power of an electric or galvanic battery metallic compositions may be formed from alkaline bases, is it unreasonable to conclude, that these substances float in the atmosphere, not in their metallic form, but in their remotest gaseous elements, and by one sudden shock in the great laboratory of nature be condensed into their metallic and ponderous state?

B. Although these singular productions have but lately attracted the attention and engaged the inquiries of philosophers, they are perhaps of frequent occurrence. They are mentioned by Albertus Magnus, Petermannus, and the celebrated Sir Thomas Brown of Norwich.

A. It is a remarkable coincidence illustrative of our observations on this subject, that if a hen break her leg during the time she is laying eggs, while the process of re-union is going on, the eggs are produced in their soft state, and without the calcareous covering. It is also no less remarkable, that if a woman happen to break a bone during her pregnancy, the union is suspended till after delivery. In both these cases the material of ossification is diverted from its proper channel to assist the broken limb.

B. Parity of reasoning would lead us therefore to conclude, that in consumption of the lungs, which you suppose is in some measure connected with an undue secretion of phosphate of lime, this disease would either be suspended during the union of a fractured limb, or if the disease continued its progress that the bones would be deprived of their matter of union. This if it were well marked, would much confirm and strengthen the doctrine you advance.

A. Accidents of this kind must sometimes happen: but the setting a bone being in the department of the surgeon, and the treatment of c nsumption in that of the physician, the relative affection between these accidents is not much the subject of remark and reasoning. It however did once occur to me in the early part of my practice. Miss Watts, who lived in the neighbourhood of Bristol, by a fall down some garden steps, fractured the thigh bone. At the time of the accident she was far advanced in pulmonary consumption. The union of the limb went on slowly but safely, during which process the disease of the lungs had so much amended, that she was thought to be rapidly recovering and quite free from danger. But soon after the restoration and use of her limb, the former complaint returned with apparently increased violence, which in a short time destroyed

ber. All the conclusions which we could at that time draw were, that she had either caught a fresh cold by injudicious exposure after her confinement from the accident, or that the primary affection of the lungs had been in a great measure extinguished by the anguish of the secondary accident. A circumstance of such importance to our knowledge of the animal economy, and the theory of diseased actions, I much recommend to the attentive observation of those under whose eye such occurrences may happen to fall.

B. This satisfies us that the material composing the basis of the bones is in considerable abundance in the animal composition, ready to be secreted and brought forward in aid of the intentions of nature. It may exist in greater or less abundance in different subjects, and at different periods. It may also be secreted by morbid action into organs, where its presence must necessarily occasion disease, by the formation of new combinations. In advanced life there is a strong tendency to superossification, and it is observed that the bones of aged persons are lighter, and more spongy and brittle, from a portion of their substance having been absorbed and deposited else-where.

A. Here too we may see a beautiful solution of the problem, why consumption is uniformly

suspended during pregnancy, and as certainly recommenced shortly after delivery. This material, so necessary and in such abundance for the formation of the bones of the fœtus, is carried to its destined intention, leaving the lungs free from its accumulative oppression, during which time the ravages of the disease cease: but this natural secretion being suspended and stopped after child-birth, its morbid action again takes place, and the disorder recommences its baneful activity. How far this idea may coincide with, or be illustrated by the theory of Dr. Beddoes, "that the cause of this suspension of the disease is occasioned by the transmission of the hyperoxygenated blood to the placenta, which acts at this time as a supplementary pair of lungs for the support and growth of the fœtus," we shall by and by have occasion to examine.

B. It is natural then to suppose, that females may have a greater abundance of this material in their animal composition than males, for very obvious reasons.

A. There are very satisfactory reasons for concluding, that women have a greater supply of the materials of ossification than men, in their original conformation. Being the passive supporters of the fœtus for a determinate period of time, they afford not only the means of its

nourishment and growth, but the formation and gradual induration of the bones. It is therefore rational to suppose, that if this be not delivered to its proper offices, it must exist in excess, and be diverted to unnatural channels, causing morbid effects and diseased actions.

B. A conjecture occurs to me, which as it is the thought of the moment, I venture to hint at with some degree of diffidence, in attempting the solution of a natural habit, the cause of which has never yet been satisfactorily explained. May not this excess, in a state of health, be periodically carried off by emmenation? We know that during pregnancy, these discharges cease, being diverted by a metastatic course to the placenta, giving at the same time arterial blood and the basis of ossification. We know also that they cease in the stages of confirmed consumption. Females are therefore mostly the victims of this disease.

A. My memory and my notes inform me, that of every twenty patients of this description, sixteen have been females; of which numberless instances might be recorded. The lady of Ambrose Goddard, Esq. member of parliament for the county of Wiltshire in England, had a beginning tendency to pulmonary affection; but marrying very early in life, became the mother

of twelve children, all in their infancy, handsome, robust, finely formed, and displaying capabilities which promised the highest degrees of mental excellencies. Of these, seven daughters fell victims successively to this disorder, some at the age of puberty, and in the full blossom of their endowments, in despight of every anxious precaution, and the most minute attention to air, diet, exercise, clothing, and every moral and physical preventive: while all the sons escaped. In the family of Mr. Salmon, a practitioner at Wickham market in Suffolk, all the daughters died, from the ages of nineteen to twenty-two, except one, who married and bore children early in life; and all the sons survived.

B. Nor is there any reason to suppose that any one of these, or most of such as we have seen struggling wit this calamity, have to look for its excitement to want of proper care, or the utmost solicitude for their health and safety, in every possible degree of human attention and precaution.

A. It is a remark worthy the most serious consideration of parents, that females however delicate, if they marry early in life, and bring forth a numerous offspring, are the most free from this and similar chronic diseases; and set-

ting aside adventitious causes, they usually live to an advanced and serene old age. Among the many examples which must occur to any one who will look around him, let me only mention our present venerable queen, the mother of sixteen children. Let it however be remembered, that I exclude from these causes and this reasoning, those cases of early and repeated dissipation which are commonly called consumption, but which are rather an atrophy and wasting of powers in consequence of premature and continued exhaustion, and where the lungs consequently partake of the general debility and diseased action.

B. We have observed that in early life, the intentions of nature are sufficiently fulfilled in the appropriation of the materials of ossification to the gradual enlargement and induration of the bones: and that when this is completed, the process must either cease, or be otherwise diverted.

A. It is at this precise period, when the stature is completely formed, and the bones have obtained their determinate bulk and substantiality, that puberty is confirmed. At this time, new actions and new secretions take place, and new organs appear to spring forth. The human frame now seems to burst from the cere-

ments of its chrysalis state, and to be transformed into the dignity of a perfect being. The energies of the mind and the powers of the body put on a decided cast, and generally present an epitome of the essential characteristic and future established habits. At this period, so subject to alienations from a variety of combined circumstances, must be dated that incipience of danger, which it is much more easy to mark with the eye of attention, than describe by any powers of language.

B. This disease then, has perhaps commenced its attack at an earlier period than is commonly supposed, and has made some advancements in its progress before attention is awakened, or alarm excited of its nature and desructive consequences.

A. I believe much earlier. The first stage creeps silently on, with so little appearance of disorder as to entirely escape common observation, or to be attributed to causes merely accidental; and either to be totally disregarded, or absorbed in the general mass of trifling ailments commonly attendant upon youth. The approaches of this malady are treacherous as they are imperceptible, except to very acute and discriminative observation. The appearances which I have found most immediately remark-

able are, a slight degree of restlessness and unwillingness to continue long in the same posture: sudden quickness in apprehension, and irritability of temper, like a slight nervous affection, often venting itself in short fits of laughter or dissolving in tears: a kind of rough spasmodic cough without expectoration: occasional bleedings at the nose: head-ache, which comes on with sudden violence, and as suddenly disappears: bright and semitransparent complexion: a luminous and piercing look, which seems to penetrate the eye it is fixt on, and wandering rapidly from one object to another: the face often flushed, but as yet without the well known circular rubescence: the palm of the hand warm and dry, without the moisture generally so sensible in young persons: the lips and inner angles of the eye-lids becoming a bright vermilion red; a peculiar lightness and airyness of shape, with motions and actions quick and hasty, and of singularly attractive elegance and gaiety. To these may be added occasional pains in the limbs, sometimes in the joints, not unlike small gouty attacks, sometimes in other parts of the body; with now and then stitches in the sides, and cramp-like pains at the lower end of the chest.

B. This then is that primary and predisposing state, so much overlooked by parents and ordinary family attendants, and regarded only as grow-

ing pains, slight colds, rheumatic aches, and the common little ailments of juvenile infirmity.

A. To these appearances, at first considered of so little importance, others more impressive shortly succeed, decidedly characteristic of this herculean malady. Short fits of coughing of so light a tendency as to be hardly remarked, with a thin expectoration which wets but does not stain a white handkerchief, only observable after coming from a cool air into a warm room. The rosy flush occasioned by exercise is concentered in a circle on the cheeks, while the other parts of the face remain pale. The stitches in the side become more painful and of longer duration: perspiration seems to lessen or disappear altogether, and the palms of the hands are dry and sensibly hot: considerable exertions or much exercise are not succeeded by that pleasing languor and desire of repose, which restores and reanimates the wastes of exhaustion; instead of which palpitations of the heart, quickness of breathing, and huried and irritable flutters take place; a glowing sensation is felt through the frame, and a burning in the stomach ilke that which is produced by swallowing acids, with an eager and unextinguishable craving for alkaline substances, as chalk, lime, meal, and various kinds of trash. The faculties of the mind seem to develope themselves with unusual facility and precocity; and the senses of hearing, taste, and smell to be singularly acute. The muscles

begin now to be visibly emaciated in the cheeks, neck, and hands, giving for the first time that appearance of high cheek and shoulder bones, long neck, and narrow confined chest: the angles of the jaw bones seem prominent and sharp-edged, and the nose thin and pointed: the fingers when held before a candle are tranparent at the edges, and when placed close to each other with the hand expanded, an open space is perceived between the joints of one finger and the joints of the next, occasioned by the waste of muscle connecting them, and suffering the bones only to come in contact with each other. After this follows, in a slower or more rapid succession, all those signs of confirmed consumption, so often detailed in elementary treatises, and so well known to the practitioner.

CONSULTATION III.

B. Phosphate of lime, therefore, which is evidently the basis of these bony accumulations, must in some constitutions be either more abundant, or by accidental combination be brought into irregular action.

A. There are doubtless many varieties in the exact material composition of the animal frame, producing not only different chemical actions, but different modulations of temperament, complexion, and what is commonly termed the constitution or peculiar idiosyncrasy. In some it may more than necessarily abound, or from defective absorption fail to be carried off by the torrent of circulation and the natural secretions: in others it may be deficient, as is perhaps the case in rickets, softness of the bones, and that singular exacerbation of scrofula called cretinism. It may, likewise, be more or less excited into diseased accumulation, or diverted from its natural destination and produce anomalous deposition, as in the ossifications of various parts, causing distortion of the bones, consumption, gout, stone and gravel. It may exist also in a softer state, as is visible in some diseased joints, where the synovia appears like a mixture of chalk, thick and soft as cream; or cause irregular actions and affections of the sys-

tem, as in struma, cancer, and scrofulous sores. By pressure on the nervous system, it may occasion that melancholy series of hopeless dejection observable in some scrofulous habits, and which so nearly borders on and frequently ends in low insanity. Many of those disorders so very little understood, which pass under the denomination of chronic complaints, may be reasonably attributed to some of these causes, as we shall hereafter have occasion to consider.

B. This would favour the common supposition, that diseases of this kind are hereditary, by a continuation of the same temperament or constitutional idiosyncrasy from one generation to another.

A. In a certain qualified degree this must, without doubt, be admitted. Many circumstantial instances convince us of its truth. The children of fair complexioned parents are fair, those from dark complexions are swarthy; scrofulous parents produce a scrofulous progeny: and even personal distortions are sometimes continued in their kind. The Rev. G. Smith, of Norwich, had that deformity of the trunk which is by no means uncommon; a large head, capacious and protruding chest, within which the neck seemed to be buried; protuberant back, great mental capacity, and a prodigious volume of

voice. All his children, soon after the age of infancy, exhibited exactly the same mis-shapen appearances. These morbid tendencies are, however, much alleviated, by that general mixture and intercourse of society, by which all marriageable persons have the choice of their mate, and that secret pleasure which we all feel in contrast. And by a lucky opposition of temperaments, morbid propensities may gradually lessen, and in a few generations totally pass away. To make use of a coarse allusion, the breeder of cattle knows well the value of crossing his stock. Jews, who mingle only with their own tribe, still preserve that peculiarity of feature by which they have ever been marked, the protrusion of the bones of the mouth, and singular oiliness of the skin; and particular lineaments, stature, manners and passions, and even general duration of life, descend in classes and families who intermarry only among themselves.

B. To make these premises relating to the formation of calcareous phosphate still more clear and evident, there must exist in the animal laboratory a power able to direct these undiscovered processes, which our present acquirements in the laws of chemical agency may give a confident hope of developement and illustration.

A. Animal bone consists of a large proportion of phosphate of lime, with some additions of car-

bonate of lime and mucilage. All the materials of this composition are in sufficient abundance in their decomposed and primitive state. Phosphate of lime, the principal basis of bone, is formed by the solution of lime in phosphoric acid: for this acid precipitates lime when held in solution, and forms calcareous phosphate, precisely analogous to the primordial element of bone.

B. Calcareous earth, or lime, must consequently form one of the fundamental principles of animal composition, and be in sufficient abundance to supply this great operation of nature. But to produce this detachment and deposition, it is necessary to admit the presence of phosphoric acid.

A. This acid is formed by the combination of phosphorus with oxygene, and greedily attaching itself to the calcareous earth, perhaps held in solution in the composite impregnated mass, is slowly deposited or accumulated by absorption upon an original nucleus or point. It is thus that calcareous phosphate is deposited for the formation of bones, the manner of which the celebrated Cuvier declares himself unable to determine: and from this point they shoot out, in consequence of subsequent depositions, into their various ramifications, not unlike the aggregation of crystals. Harvey observes, that in the eggs of poultry, after

they have been sat upon forty hours, the back-bone is first visible and begins to thicken: some hours after, it becomes opake; and in a short time begins to branch off to the several limbs, putting on for the first time the consistency of bone.

B. We are now arrived at that remotest deductive point of reasoning, which forms by demonstrative proposition the establishment of truth. One other highly necessary question remains for solution, upon the credibility of which, as upon the foundation stone of the structure, the strength of the fabric rests. It will be readily foreseen that this question alludes to the formation of phosphorous or phosphoric acid from the simple elements of its composition.

A. It was before observed, that oxygene uncombined is in a state of perfect quiescence or inactivity. Phosphorus we know has a ready affinity with it; and we know likewise that this substance abounds in considerable quantities in the great animal mass, in the muscles, in the blood, and perhaps in the nervous system.

B. It must nevertheless be made to appear, that it exists in its simple state, ready to be acted upon by its affinity with the respirable oxygene of the atmosphere.

A. We have no reason to doubt its absolute presence in this state, nor that it may enter into immediate combination and action with whatever substances it has affinity. Henckel, in his Pyritologia, relates a curious circumstance corroborative of this assertion. One of his friends, a young gentleman of sanguine complexion, after excessive exercise in dancing, perspired to such a degree, that his life was thought to be in danger. Whilst he was undressing, traces of phosphoric flame were observed upon his shirt, which were visible for a considerable time. After the light of the flame was extinguished, there were left behind on the linen, spots of a yellowish-red, exactly resembling the residuum of burnt phosphorus. Here we observe, that this substance in its simple state, was by the great heat of the body transmitted with the perspirable matter, ready to become luminous and burn in contact with the atmospheric air. A friend of mine, of strong athletic make, after a hard day's exercise in shooting and a liberal use of wine, retired to a wall in the dark, and was alarmed to find the place upon which his urine was forcibly scattered, emit flashes of light and become suddenly luminous.

B. Those corruscations of light which are emitted from the heads of sturdy black or red-haired girls, and from the backs of black cats and

horses, when rubbed in the dark, are perhaps phosphoric scintillations. Yet I have heard them attributed to electricity, as they are asserted to be accompanied with audible sparks.

A. The sparks I have never heard, though I have often witnessed the emanations of light. If they were electric, the usual sensations accompanying electricity would be felt, which I believe is not the case; and even if these sparks were distinct and undeniable, might they not be occasioned by the phosphorus being in solution in the fluids, and in its transmission be combined with some particles of calcareous matter? For if phosphorus be put in water, and a small quantity of lime sprinkled in it, coruscations of light are produced exactly similar, accompanied with audible sparks.

B. The light emitted by glow-worms and the lanthorn-fly is caused by phosphoric gas contained in a transparent vesicle, which at the time they are luminous is turgid and inflated, but which becomes contracted in proportion as the light disappears, and at their death, or when they do not shine, is a mere empty shrivelled skin. This singular provision is exhibited only by the females, and at that particular season of the year when they seek their mates. It is asserted that the fingers become luminous when this part of the insect is rubbed between them.

A. The learned Sir Thomas Brown seems to have had a foresight of this doctrine, who observes, "that philosophy may yet inquire, whether the light of animals, which do not shine from contingent causes, be not of kin unto the light of heaven; whether the invisible flame of life received in a convenient matter, may not become visible, and the diffused etherial light make little sparks by conglobation in idoneous parts of the compositum."

B. The gleams of light which flash from the eye upon the excitement of delightfully pleasurable sensations or furious indignation, are emanations of phosphorus, visible in their luminous state in dark places only: and those terrifying and piercingly bright looks, which enraged animals, particularly of the tiger and cat kind, cast around them in the dark, are from this source. Putrid meat and half rotten carcasses often throw out light in the dark. That singularly illuminated appearance of the sea in a still autumn evening, when it is broken into waves or disturbed by agitation, and called by mariners the sea-bream; and the bright and soft light emitted by rotten wood and fish when it begins to decay, is likewise supposed to be phosphorescent.

A. Care must be taken not to confound similar appearances, nor to attribute to the same cause

effects which have a distinct origin. These effects may be produced not only by phosphorated oxygene, but also by phosphorated hydrogene gas. Animal matter in its decomposing state forms hydrogene gas, which coming in contact with the atmosphere takes flame, and being impregnated with phosphorus already in abundance in the animal frame, causes many of these luminous appearances.

B. If they originate from this latter cause they are analogous to burning wells, ignes fatui, and those aerial illuminations which sometimes hover over and glide along morasses, cemetaries of the dead, and other putrescent repositories, and which vulgar superstition has long created into the spirits of departed persons. The very word ghost, and the modern term gas or aeriform substance, both originate from the german root, ghascht or spirit.

A. At the commencement of animal decomposition this gas is evolved in considerable abundance. This is satisfactorily illustrated in animal bodies which have lain in the water some time. The dead body being at first specifically heavier than water, sinks to the bottom; but in a few days decomposition beginning to take place, a quantity of hydrogene gas is collected, making the body lighter than water, when it

swims on the surface; upon the same principle that a balloon filled with air lighter than that of the atmosphere, floats and is lifted upwards.

B. It has been somewhere remarked, that at a certain time after death, the countenance assumes a kind of splendid and serene dignity, superior to any expression in its living state, covered as it were with the glory of its entrance into immortality. This must happen at the precise period when dissolution and decomposition take place, and phosphorated hydrogene escapes, not sufficiently powerful to be visibly luminous, in consequence of the coldness of dead bodies, but yet enough to produce these softer appearances.

A. Mrs. Symes, whose name has been before mentioned, a young lady in her twentieth year, about half an hour before she expired, was lying in a darkened room with only a maid-servant sitting by the bedside, and supposed to be in a slumber. The screams of the servant roused the attention of the family, supposing that the lady had died suddenly. Upon inquiry of the terrified girl as to the cause of her alarm, she declared that she had seen what she described as fiery spirits, of a blueish colour, hovering round the head of her mistress, and that they appeared in flashes round the temples and face. It is proba-

ble that though the lungs had not yet ceased their functions, some internal parts of the body were already in such a state of decomposition as to form hydrogene gas, which combining with phosphorus and oxygene, and aided by the heat as yet retained in the system, were sufficient to cause these illuminations.

B. Coruscations of this kind have been before observed; but as they mostly come to our knowledge through the usual exaggerations of nurses and the lower kind of attendants, they have not obtained much credence, but have been regarded as the fancies and terrors of a superstitious imagination. And being only observable in a darkened room, are the less likely to become the objects of more explicit and scientific inquiry. That partial decomposition, and the evolvement of hydrogene gas take place before the visible extinction of all the organs of animation, is probable from the peculiar odour respired by persons in the latter moments of lingering complaints, particularly consumption, and which has the disagreeable and fetid smell of this air.

A. Man, after death and inhumation, does not turn to dust, nor is his body destroyed by worms, as it has been forcibly but poetically ex-

pressed. But by gradual decomposition he is estored to those elementary principles of which when living he was materially composed ; elevated, as it were, to those aerial regions from whence in a substantial form he was descended. And in this manner he may be said to undergo a transmigration or reanimation from one body to another.

B. The affinity of phosphorus to the mixed materials of the atmosphere, we know to be greater than to pure oxygene ; for with pure oxygene it is with difficulty brought into illumination, but with oxygene mixed with its usual proportions of azote and nitrogene, it readily inflames at a certain degree of temperature.

A. Phosphorus becomes united and ignitible with oxygene at about the temperature of the human body, and in its slow ignition is not consumed in flame, but produces phosphorous acid. To from this union and to produce this result in the animal body, the atmospheric oxygenous mixture is taken by repeated inspiration into the lungs, and coalesces with the phosphorus of the system. This acid attaching itself to the calcareous earth forms phospate of lime. Here we see the simple origin of bone, of calcareous concretions, and ossified accumulations. And as in this union the oxygene parts with its caloric, heat is communicated to the animal system.

B. All animal calcareous concretions, whether phosphates, carbonates, or oxalates, are a neutralization of the acid by the alkali, causing the formation of these depositions, which future inquiry may possibly find in a state somewhat like crystallization.

A. And as oxygene gas, by combining with the blood and its attendant components, forms carbonic acid, the absorption of this acid causes the head-ache usually felt at times by persons affected with the disorders incident to these combinations.

B. Heat cannot be produced by any other means than its escape from oxygene: and whatever absorbs or decomposes oxygene must be the agent combining to generate heat. Phosphorus is the only known animal substance able to form a spontaneous union with oxygene, and to create this effect. That fire which is produced by the friction of two substances together, by metals on a grindstone, or by repeated strokes of the hammer on iron, is caused by the rapid union of their oxygene with some of the bases having an affinity with it.

A. The scintillations formed by striking fire with flint and steel, appear through a microscope to be small roundish balls of a grayish colour,

much resembling meteoric iron stones, and probably of the same nature and origin.

B. The suggestions you have thrown out respecting the origin of heat as applied to animal functions, if they are warranted by the just philosophy of nature, open to us the fountains of animation, and disclose by their simple laws the remote springs of vitality. Mere oxygenation is incompetent to the solution of their phænomena: and all reasoners upon this abstruse subject have allowed, that some latent power, as yet unknown to them, must combine in the production of their effects.

A. The principles of respiration and circulation upon these data are thus simply defined. By the inspiration of atmospheric air, its oxygene enters into affinity with the phosphorus formed in or secreted by the lungs, and disengaging its heat gives stimulation to the heart and arteries, while the superfluous nitrogene or azote, together with a portion of hydrogene, are discharged by expiration, and a fresh volume of atmospheric gas inhaled. During this process water is formed, which being taken up into the system is carried off by perspiration, and also a portion of carbonaceous matter which passes off by secretion. By the stimulus of the heat thus delivered to the lungs, the heart, and the arteries,

that spasmodic action called pulsation is excited, and the blood thus animated is propelled from valve to valve, till meeting with the anastomosing vessels it is delivered to the veins, and brought back to the heart deprived of much of its activity and of a deeper colour, and ready for the re-invigoration of oxyphosphorescence and heat. Circulation is completely performed in about two minutes and a half: and if the breath be renewed forty times in a minute, the blood receives a hundred doses of this reanimating power during the time it performs one circulation. It was a favourite opinion of John Hunter, that the blood possessed a degree of absolute life and communicative vitality. And thus we may say with Sir Thomas Brown, "that life is a pure flame, and we live by an invisible sun within us:" and with Hippocrates, "that the great principle of nature must be resolved into heat, which appears to have something immortal in it."

B. Animation and vitality, then, seem to be a continual process of spontaneous combustion, and in its philosophical solution differing nothing from all other spontaneous developements of heat, caused by the union of oxygene with some other simple body with which it has a greater affinity than with its own caloric. In this manner vegetable matter heaped together without being sufficiently dried, heats and takes fire.

A. When new mown grass is packed together in too green a state, a quantity of hydrogene is evolved, which from the compactness of the mass cannot escape by evaporation, and combining with the oxygene which it holds, forms water, or what farmers call the sweating of the mow. If this combination goes on rapidly, the oxygene parts with a sufficiency of its caloric to produce heat, and at last conflagration. And when these fires are said to be kindled by a flash of lightning, it is probable that the flashes are caused by the mixture of gaseous fluids which are thrown off in contact with the atmosphere. Trees and their fruit are often blasted in gardens in a single night, and sometimes even killed, as has been supposed by a flash of lightning, but more probably by the sudden inflammation of gaseous exhalations. Fresh litter from stables heats still more violently and quickly, notwithstanding the great quantity of moisture with which it is charged, perhaps from containing uric phosphorus, but seldom takes fire because of its wet state. Good old rotten dung seems to be vegetable carbon well saturated with ammonia.

B. The conflagrations which take place spontaneously in magazines and repositories of hemp and cordage, in painters' rooms and the stowage of ships, and which are often attributed to undiscovered accident or invidious design, are fre-

quently from this origin. The conveyance of old clothes in vessels forms a considerable traffic from the port of London to Hamburg and many of the northern cities, which from their known tendency to spontaneous imflammation pay double insurance: and washerwomen often find, that if dirty linen be laid together in large heaps for any length of time, it will heat, and if not spread abroad and often turned, take fire. The dry rot, which formerly committed such destruction in newly built houses, and has latterly been so alarming in the navy, and which was supposed to be occasioned by a small fungus, the Boletus lachrymans, is a slow combustion caused by the mixture of oil colours on unseasoned timber: where the hydrogene of the watery sap of the wood, uniting with the oxygene of the paint, effects the disengagement of its caloric. It is possible that those spontaneous conflagrations, which are recorded to have sometimes consumed the human body, and reduced it to an oily carbonaceous matter, have originated in similar gaseous combinations.

A. Phosphorus I suppose to be more in diffusion in the universe, than has been hitherto considered. It is probable that the sun, the fountain of all life and animal powers, is surrounded with an atmosphere of phosphorus, which mildly combining with the oxygenated

atmosphere of the earth, is the cause not only of its light but its warmth. It is evident that oxygene is absorbed and decomposed by the sun, for the light of this orb extinguishes culinary fires by depriving them of their necessary support and supply. Its presence also deprives many compound substances of a part of their oxygene, such as the conversion of the oxymuriatic acid into simple muriatic.

B. It is by no means unreasonable to conclude that all the planets have their peculiar atmosphere, the combinations of which may cause the various changes incident to their union. Comets, for example, may be surrounded with hydrogene, imparting moisture, which in their approximation to the earth cause those incessant rains and stifling sensations, as from a partially exhausted receiver, by damping the powers of phosphoric emanations, and preventing their union with the oxygene of the atmosphere; whence the darkness and gloom observable in moist and foggy weather, and the langour felt in inhaling it: and whence the common opinion, that the approach of comets portends pestilence and dearth, and national calamities. The ancient astrologers, whose wisdom consisted in the continual contemplation and minute observation of the heavenly bodies, with some appearance of

reason formed all their predictions from the relative situation of the planets.

A. Philosophy may without offence suppose the general deluge to have been caused by a vast mass of hydrogene poured into the region of our atmosphere, and so have produced waters sufficient for the vengeance intended. The Almighty, who mostly acts by secondary means, may have issued out his comets to cause the windows of the heavens to be opened for the space of sixty days.

B. Hydrogene gas, being much lighter than oxygene, will float above the oxygenated atmosphere, forming an hydrogenated region, which diffused and mixed by heat may cause many of the common phænomena of the atmosphere: and this is the more probable, as we find those who have ascended in balloons to a considerable height become drowsy, a well known effect of the inspiration of an air with less than its proper proportion of oxygene. Thus may we reasonably conclude, that those planets which from a near approximation to the sun have been supposed to be comparatively hot, and such as are remote to be in proportional comparison cold, may by combinations of their respective atmospheres, unknown to the philosophy of our own globe, be in the enjoyment of temperatures not

less delightful than the most favourable of that which we ourselves inhabit.

A. Whether the heat, and consequently the light of the sun be remotely caused by this union, it is by no means difficult to prove. The rays of the sun alone, when concentred into a focus, are endued with that collected force by which inflammable substances may be ignited and consumed: the focal rays of all other fires or ignited substances, however fierce, have not this power or effect. If therefore the rays of phosphoric gas, heated and illuminated by its union with oxygene, and gathered into a focal point, raise a thermometer or set fire to gunpowder, the fact is demonstrated. The great heats of summer and of tropical climates, will then appear to be caused by the decomposition of the oxygene of the atmosphere by its union with the phosphorescent gas of the sun, and consequent escapement of caloric. It has long been a paradox in philosophy, that those regions which are nearest the sun are often the coldest: and many facts show us, that relative approximation to its orb by no means supposes relative degrees of heat. The sun is therefore the fountain of heat, only as it delivers a power by which heat is generated. And when we breathe the soft and mild atmosphere of a summer's day, we inhale the oxygene already in a state of solution or incipient decom-

position: whence the necessity of a warm and mild climate to such whose lungs are much debilitated.

B. In vegetables we know that phosphorus exists, and that it mineralizes with many of the earths and metals. Whether those flashes of light which are discharged from the Fraxinella or bastard dittany, in a clear and still autumn evening, upon the approach of a candle, are phosphorescent, or caused by the transpiration of hydrogene gas, no examination has yet ascertained: but probably the former, as they are unattended by any kind of explosive noise.

A. It appears also to be the source of chromic, if I may so denominate the colouring principle, by the decomposition of oxygene and absorption of phosphoric gas. The inhabitants of tropical climates are coloured; those of the colder zones are fair or colourless; and consumptive persons, who may be said to be in a state of oxyphosphorescence, have complexions singularly bright and semitransparent. The summer sun tans the kin; but it is observed, that the fair complexions of such as are consumptive are not subject to be tanned. Vegetables deprived of the presence of the sun have no colour, whatever supply of oxygene is given to them, as is seen

in bleached celeri and endive, and the shoots of potatoes thrown out in dark places.

B. This has been hitherto attributed to the formation of water by the combination of their transpired oxygene with hydrogene, and giving to them a more abundant supply of their natural nourishment.

A. It does not appear that hydrogene more abounds in dark places than in light. Deprive a chamber in which plants are placed of solar light, and supply its deficiency with any other artificial light, and let the temperature be such as is sufficient for their growth, and they nevertheless become gradually colourless. The presence therefore of the materials composing solar light is necessary to the existence and preservation of their chromic: for this reason the plants of tropical climates are enriched with the most splendid colours, while those of colder regions are comparatively pale and achromic. Linens, wax, tallow, and other substances, are bleached by the abstraction of the oxygene contained in their animal oils; for which purpose they are exposed to the night air and morning dews, which are suffered to evaporate by the influence of the rising sun. It is for this purpose that soda, soap, and lie are used in washing linens, which gradually whiten if they are dried by a

morning sun, but not if they are dried before a fire, as the inhabitants of cities well know. And in proportion as they become whitened they lose their texture and firmness, and are reduced to a mere vegetable fibre, in consequence of the decomposition or loss of their oxydated material or oil.

B. If vegetables absorb solar light, which you suppose to be an emanation of phosphoric gas, its union with and decomposition of the oxygene contained in them must occasion some degree of heat.

A. That vegetables have a temperature independent of the mere atmosphere, is proved by the experiments of Dr. Hunter, who placed a thermometer in a hole made in a sound tree, and observed that it constantly indicated a temperature some degrees above that of the atmosphere when it was below 56 degrees of Fahrenheit, but in hotter weather was always several degrees below that of the atmosphere. An internal combination must therefore take place to produce this preservative heat; for it was also observed, that the sap, which out of the tree would freeze at 32 degrees, did not freeze in the tree under an accumulation of 15 degrees more of cold. The moderation of its heat in scorching

weather must be attributed to the continual evaporation of its transpired fluids.

B. These are subjects full of interesting matter and capable of much curious detail, upon which the mind might dwell with delight, and lift itself into many useful contemplations: but it is necessary to revert to that branch more immediately illustrative of the doctrines we are in pursuit of.

A. The union of phosphorus with oxygene seems to be the original principle of vitality, the fountain of animal heat and animal action, the vis vitæ and punctum saliens of the antients; the etherial spirit pervading all living bodies, the nervous fluid, the electrical permeator of the old school, and the generator of irritability and excitability of the moderns. In youth its influence is in full force; in advanced age its powers become more contracted and languid; in old age it seems gradually to decline; and in more than a poetical sense, man may at last be said to be extinguished, like a flame expiring from the exhaustion of its fuel.

B. In the early periods of life the blood is mostly arterial, subject therefore to greater influence from these combinations; whence the vigour, elasticity, vivacity, comeliness, grace

and beauty of youth. In riper age the veins enlarge, and the arterial and venous blood seem to be equally balanced, when the passions and tumults of youth begin to subside, and give place to sober and sedate manhood. In the decline of life and progress of old age, the blood is mostly confined to the veins; the arteries become contracted or choked up with accumulations, and the frame seems not only to have lost the quickness and alacrity of youth, but the firmness of manhood: then come imbecility and infirmity, paleness and laxity of muscle, coldness of the limbs, the aches and pains of exhaustion, slow and unsteady pulse, swollen veins, at last loss of memory in a gradually retrograde scale, loss of the faculties of hearing and sight from rigidity of the muscles subservient to their office, loss of taste and smell from laxity and torpidity of their exciting papillæ, till at length second childhood takes place, and the torch of life burns out from the total waste of its material of inflammation.

A. Another circumstance worthy of our consideration, as coincident with the suppositions already advanced, is the hollowness of the ribs, and distortion of the chest so materially symptomatic in florid consumption.

B. The hollowness in the ribs of the left side has been often a subject of remark among medi-

cal men, and has been supposed to be occasioned by the loss of a portion of the substance of the lungs. The carinated or keel-like appearance of the breast bone is attributed to emaciation of muscle.

A. The supposed loss of a small portion of the bulk of the lungs is hardly sufficient to account for an absolute alteration in the structure of the ribs, or that it should cause them to be visibly pressed inwards. Dissection shows us much disease, but by no means any material diminution of the lungs; and the ribs appear distorted, soft and spongy, with an evident decomposition of their basis and deficiency in their substance.

B. Beddoes and other writers have also noticed this, but unable to give a reasonable solution, have left the fact exactly as they found it, without any attempt to investigate its cause.

A. The formation of phosphoric or some other acid can alone give a reasonable solution of this effect. By the excess of this acid, the earthy part of the bones is attracted, perhaps y absorption, and phosphate of lime is formed in the body of the lungs: the bones are thus left deprived of a principal part of their basis, and become diseased and unsubstantial as they are found in this disorder. This is also the case

with the bones of the chest, which become deformed, porous and soft. Thus by a sort of chemical metastasis, the calcareous material by which the bone is formed and indurated, is by the superfluity of two of its formative parts, phosphorous and oxygene, left to suffer a reanalysis of this very portion of their structure, and an alienated production of morbid concretions. How else are we to account for the loss of phosphate of lime in one organ or part, and its re-appearance in another?

B. Here is also a reason for those pains in the side and chest so continually harrassing the patient, which are evidently effected by slow and chronic action, and which have hitherto been mistaken for the acuteness of inflammation. And as during this process a quantity of caloric must be disengaged in consequence of the consumption of oxygene, that continual fever and quick pulse is thereby excited by which the sufferer is daily consumed. The emaciation of the muscles is owing to the loss of their earthy and alkaline parts by decomposition, which parts are necessary to the production of fat. And now favour me with your ideas, how far this theory and these premises will coincide with that great profusion of animal spirits and flattering hopes so fatally attendant on this malady.

A. Besides phosphate of lime there is a greater or less proportion of carbonate of lime in animal bone, in the formation of which carbonic acid must necessarily escape. Carbon is also left after the decomposition of animal fat, which in combination with oxygene forms carbonic acid gas. The effects of a small portion of this gas inhaled are too obvious to need explanation. Consumptive persons have mostly an excessive vivacity, very much resembling such as are elevated by a few glasses of champaine, cyder, perry, or any fermented liquor abounding in carbonic acid, and from the same causes. Thus we observe as a marked and distinguishing characteristic of this disease, that its objects are fond of new and splendid dress, gay equipage, youthful and joyous assemblies, continually forming plans of future establishment and grandeur, pourtraying the most delightful scenes of happiness and enjoyment when their health is restored, to the re-establishment of which a delusive hope always leads them until almost the last moments, and upon these subjects incessantly conversing like men half intoxicated. Miss Llewellyn of Cowbridge in Glamorganshire, the day before she died, and when it was announced to her friends that it was barely possible she could survive forty-eight hours, ordered her chair and purchased a profusion of wedding garments.

B. From some experiments made by Dr. Pearson and recorded in the philosophical transactions, it appears that phosphorus combined with an alkali absorbs and destroys carbonic acid gas, and probably a portion of azote: another combination must therefore exist to account for its presence and active effects. And in what manner is the remaining carbonaceous mattter disposed of?

A. Besides phosphoric acid, there is also an oxalic acid in greater or less quantities, and which forms an oxalate of lime. If therefore this acid combines with the carbonate of soda, one of the products of animalization, an excess of carbonic acid is disengaged, beyond the power of a phosphoric union to absorb. So that this effect may be produced either by a relative deficiency of phosphoric, or an excess of oxalic acid. The residuum of carbonaceous matter is gradually carried off by the secretary organs. And if the excess of the carbonic acid be not decomposed and destroyed, these high animal spirits and intellectual reveries are elevated into the delirium of absolute insanity. It is by no means uncommon to see the rapid stage of consumption suddenly arrested by fits of insanity, which invariably recommences upon the restoration of the faculties of the mind. Mr. Vanderhorst the American consul at Bristol, had two

daughters who were twins: at about the age of nineteen they both became indisposed: one of them however soon married, and is now the happy mother of a numerous offspring: the other fell into a rapid decline, which was occasionally checked by flighty irregularities of the mind, and in a short time ended in a complete dereliction of the reason, during which all the symptoms of consumption had vanished. At the time I saw her she was in that dreadful state of outrageous confusion, with those unconscious sensual tendencies described under that calamitous affliction called furor uterinus. The case and its eventual termination was clear and evident, and I was obliged to offer her unhappy friends the dreadful alternative, of a long continuance of the melancholy wreck she then exhibited, or by the restoration of her reason, the certainty of her falling a rapid victim to the original affection of the lungs. The latter was naturally made choice of; the delirium was soon subdued, and in about three weeks afterwards she died.

B. It is an axiom common to physiologists, that diseased actions are incompatible with each other, but a lesser affection is absorbed and as it were quenched by the action of a more powerful one. A species of puerperal insanity not unfrequently occurs soon after childbirth, connected probably with a disarrangement of the natural

discharges, and an undue formation of carbonic acid. Is the salt taste so commonly complained of, and so decided a diagnostic of pulmonary affection, connected with this combination ?

A. The blood contains a portion of muriate of soda or common salt ; for after exposure to the atmosphere some time it is covered with its efflorescence, which in ulcerations of the lungs is conveyed with the expectorated mucus to the organs of taste. Oxygene may also so decompose the phosphorus of the blood, as to bring forward the muriate of soda.

B. It should then seem that those climates where the oxygene of the atmosphere is in its greatest state of purity, and consequently most ready to combine with the phosphorus of the system, are the soils where the seeds of consumption mostly germinate.

A. Northern and temperate climates alone are the gardens where this and other chronical complaints bearing a great affinity with it flourish, and for very palpable reasons. In cold climates there is an abundance of pure atmospheric air, the oxygene of which is undecomposed by the phosphoric heat of the sun, in consequence of its absence for a longer period of time, or its weaker action. And though there is in every

part of the globe an equal annual proportion of the presence and absence of this luminary, yet their periods are very unequal. So in the months of May and June, when the sun has acquired its greatest range and elevation, the weather is usually very cold, in consequence of its long previous absence and want of influence having rendered the earth in a torpid and cold state. But under the tropics where the sun shines regularly twelve hours every day, the earth and atmosphere are kept in a state of constant warmth, there not being any intermediate time for long repose and cooling, and the inhabitants enjoy a double succession of the products of the earth. Thus the autumn, when the sun has declined, is the warmest season of the year; and between the hours of two and four in the evening, long after the sun has passed the meridian, is the hottest part of the day. The oxygene of the atmosphere is therefore less absorbed by the phosphorescence of the sun in cold climates, and has most power of combining with the phosphorus of the animal system, and producing excess of action. It is therefore in the winter and the spring that this disorder makes its most fatal ravages, when the weather is extremely cold, or just begins to be awakened by the influence of an increasing sun: for all stimulative affections are excited into increased action after previous torpidity, as inflammation and suppuration are usually preceded

by shiverings, and the fever of an ague by the cold fit. So after a night's rest, when early in the morning the dews begin to evaporate by the appearance of light and warmth, and the atmosphere is in its coldest state, those excessive fits of coughing commence which form a true characteristic of consumption, and which from their agitation and distress terminate in dangerous and colliquative perspirations.

B. In hot countries we know that there are none of the chronical disorders of this tribe which waste and harass our own zones, such as consumption, gout, scrofula, asthma, and rickets; but their diseases are chiefly fevers, complaints of the liver and alimentary canal, and some cutaneous affections. Langour, debility, and bodily exhaustion consume and enervate the inhabitants of hot climates, in consequence of a deficiency of atmospheric oxygene, which is consumed and decomposed by the phosphorescence of a continual sun. And it is not improbable that those destructive winds mentioned by travellers under the names of siroc and simoom, are totally robbed of their oxygene in their passage over those boundless sandy deserts of the east, and rendered a dry and poisonous vapour.

A. Upon this principle it is that we see cities and swampy counties more exempt from this

disease, and more subject to those of deficient excitement, as agues, dropsies, and low fevers. In dry and gravelly soils consumption holds its empire with dreadfully destructive vigour: in fens and marshes it is commuted for low and debilitating complaints. In mountainous districts where there is a continual evaporation of moisture, and where the surface of the body is constantly exposed to cold damp vapours; scrofula, rheumatism, wens, and strumous excrescencies stand in the place of the more active distempers. So far are we subject to the influences of climate, or rather the exhalations of peculiar soils, which cultivation and the amelioration of social life may gradually extenuate, and it may happen eventually remove.

B. A general change of dress and habits of life, especially among females, must in some measure have affected the constitution. Within the last century there has been a gradual alteration in this respect, from animal to vegetable clothing. The rich and cumbrous silks, stuffs, woollens and flannels, observable in the costume of a few generations since, have given place to the light and airy garments of linen and cotton. All animal substances are non-conductors of heat, and already highly charged with oxygene. Vegetable substances, especially such as are bleached and reduced to a mere vegetable fibre, conduct

heat and dispose the body to the absorption of oxygene. Place a small square patch of white cotton or linen on snow exposed to the heat of the sun, and at the same time a piece of dark cloth of the same size. In a few hours the cloth will have sunk considerably into the snow, while the linen remains on the surface hardly influenced by the heat of the sun: the oxygene of the animal oil in the cloth is decomposed by the phosphorated rays of the sun, and heat is generated, but on the linen already deprived of its oxygene the sun has hardly any influence. Thus woollen clothing is warmer than linen, and white linen the coolest of all. It is for this reason that fine flannel next the skin is so valuable in warm climates, and to persons using violent exercise, that the great heat of the body may not escape too rapidly, but be gradually brought down to the standard of the surrounding atmosphere.

A. However melancholy the consideration may be, I am nevertheless apprehensive it is founded in some truth, that those amiable propensities which give graceful elegance and ornament to young persons, should afford an additional aid to tendency and predisposition to consumption. The readiest victims of this disease I have mostly found in the daughters of country gentlemen and clergymen, whose habits and affections are placid and uniform, whose pursuits

and duties are regulated and unruffled, whose dress and persons are simply neat and remarkably cleanly, simplex munditiis, and in whom the stream of life glides calmly and harmlessly along almost to stagnation, without those alternations or contrasts which the bustle of compact and active society unavoidably offer. In youth there is a rapid accumulation of excitability, which the agitation of unrestrained exercise can alone conduct, to balance the system, and which the restrictive compulsions of modern education in general keep in to a painful and nervous degree of unresisting anguish. Boarding schools, as they are mostly conducted in England, except where there is a frequent allowance of free exercise, I consider as the depositaries and manufactories of incipient consumption, distortions of the person, and a numberless list of diseased accumulations. How often have I looked with commiseration on a train of young and lovely maidens, silently and slowly marching along in pairs, like a troop of recruits, or the gallant horses in a state coach, not daring to stand at ease, for the purpose of what is called air and exercise: any one pair of whom, if they were drawn out and suffered to expand themselves by half an hour's vigorous exertion and boisterous mirth, would return to their ranks erect, happy, and with eyes shining like diamonds, and cheeks blooming like roses.

B. The pangs of these innocent victims are mostly reflective, and their bitterness chiefly felt by parents, by relations, and by beloved friends. Mason, the biographer of the poet Gray, whose family suffered much from consumption, has beautifully observed, " that as this malady attacks the young and the innocent, it seems to be the merciful intention of Heaven, that to such death should come unperceived and as it were by stealth, divested of one of its sharpest stings, the lingering expectation of dissolution."

CONSULTATION IV.

A. Of a substance forming so great a share in the animalization of the human body, and possessing such prodigious powers as phosphorus, it is rather surprising that so little notice has been taken in the researches of modern physiology. A few scattered facts, casually detailed, are all we know of its effects; but these hold out possibilities, far exceeding all the materials hitherto offered for administration. As far as I know, it has not yet made its appearance in any pharmacopœia.

B. Its great activity, and dangerous powers if administered incautiously, may perhaps have deterred the legislative guardians of the art of medicine from committing it to common and extemporaneous use.

A. Danger is always a relative term, and in these cases commensurate and parallel with ignorance or carelessness. All therapeutic substances are dangerous in their excess or misapplication. The great Doctor James was committed to Newgate by the President of the College of Physicians of London, for having first adventured to administer cantharides internally in a desperate case, and recovering his patient: and

so deleterious to the safety of his Majesty's liege subjects was the smoke of coal once thought, that upon a report from the same venerable College, its use was prohibited by an act of Parliament as a poisonous mineral, in the metropolis and within seven miles round. Arsenic, corrosive sublimate, foxglove, opium, and many other drugs now in common hands, are infinitely more dangerous, yet are they committed to popular administration. In the translation of the last London Pharmacopœia, published under the authority of the College by one of their own fellows, as a directory for the great mass of dispensing practitioners, the arsenical solution is directed to contain four grains of the mineral in every ounce, yet we are gravely told that each drachm contains only one-eighth of a grain of arsenic. Thus by a careless error in calculation, this most fatal drug is recommended in four times its intended quantity. And in the solution of corrosive sublimate, there is in each ounce half a grain; but we are by this translator and director informed, that only the eighth of a grain is contained in half an ounce, the dose proper to be administered, consequently doubling the quantity intended to be recommended as the ultimate safe dose for administration. When the company of stationers, in a licensed impression of the Bible, had unfortunately omitted the monosyllable, not, in one of the commandments, the

whole edition was ordered to be destroyed, and the company severely fined for their negligence. Yet is there a large impression of this translated pharmacopœia dispersed abroad, and in the hands of apothecaries and dispensers of medicine, sanctioned by the imprimatur of the president, and licensed by the censors of the College.

B. Phosphorus, as far as our knowledge of its properties will allow us to judge, is a simple substance. Its affinities, except with the atmospheric air, are unknown. Given internally it appears to be the highest and most stimulative cordial which has yet been discovered, and far exceeding all other simple or compound articles of the materia medica. And if the physiological aphorism be true, that diseases of inanition are more dangerous than those of repletion, it offers a noble aid to our present stock of medicines of this class.

A. It has the remarkable advantage over all other known stimulants, of not leaving behind it the debilitating and prostrative effects of opium, wine, spirits, and the usual class of corroboratives, but gives strength, vigour and powers, without subsequent deduction from the previous standard of health. And as most of the afflictions which occur in life are evidently diseases of debility, the possession of a remedy of this nature in

judicious hands must be a great desideratum in the materia medica. Langour and exhaustion make up by far the greater number of our ailments. All who die of agues die in the cold fit. The fatal stages of all diseases, even acute ones, are those of debility. Old age and natural death are gradual diminution, and at length total exhaustion.

B. The few who have written upon experimental proof of its effects on the animal frame, give very extraordinary evidence of its powers. By the cases recorded in Mentz's Thesis, it appears to have produced wonderful effects in the last stages of malignant and putrid fevers, when all other remedies had been tried in vain, when the general prostration of the powers of life, and all the attendant symptoms proclaimed a speedy dissolution. In all these cases the occasional exhibition of a grain or two of phosphorus, produced in a few hours a reanimation and restoration of the senses, and a gradual re-establishment to health from the most wretched and hopeless state.

A. The celebrated Wolff details a number of cases of low and malignant fever, where the small and tremulous pulse, hardly to be distinguished under the finger, the livid spots upon the chest and arms, the cold extremities and wan-

dering intellects, could hold out to the practitioner but little hope of success, were not only all relieved, but all, as it were by divine interposition, revived and ultimately restored by this wonderful remedy.

B. A medicine of greater powers, if skilfully exhibited, cannot be named. Like sulphur, charcoal, and many other substances in themselves almost insipid and inert, it produces its powers only when combined with oxygene: and like arsenic, copper, quicksilver, and most of the metals, which in their simple metalic state have a very weak action upon animals, it becomes stimulant even to gangrene when sufficiently oxydated. Weichard, who seems in one instance to have given it to excess, confesses that his patient died gangrenous, precisely as he would have done from an overdose of arsenic or oxydated mercury. The same thing happened to Professor Zessler, and he mentions it as a cautionary admonition, to show that the noblest means which wisdom and experience have placed in our hands, become useless and dangerous only from ignorance and want of caution.

A. Mr. Leroi not only gave it to various animals, but tried its effects in an extended degree upon himself. His report gives us much confidence in its exhibition as a surprising resto-

rative, in loss and decay of the powers of vitality and muscular action. The quantity he took at once was three grains, which at first produced some very unpleasant feelings in the stomach: but when these were allayed, his muscular force was doubled, with a painfully eager desire to exert itself, and he felt an insupportable venereal irritation. He gave eight grains of it to a dog, who at first seemed rather distressed and anxious to escape, but soon after acquired a ravenous appetite, and an inclination uncommonly great to leap and run about, so that nothing seemed too high or too distant for his attempts at violent exercise.

B. One of its most predominant properties is the great excitement it gives to sexual desires. Four grains of phosphorus were mixed with a handful of crumbled bread, and thrown among some poultry. In about half an hour the combs became of a deep scarlet, the eyes uncommonly luminous, the bodies seemingly dilated, and the feathers bristled up into a posture of boldness and defiance; the cock in a kind of impatient fit, bis cum omnibus gallinis cohabitavit, and they afterwards got fighting all together. It is probable that the violent effects of cantharides when taken internally may be attributed to the phosphorus contained in their oil. Even when applied externally as a vesicatory, this effect is sometimes

severely felt from the absorption of this powerful agent.

A. I have no doubt of being able so to feed a fighting cock, or any pugnacious animal, with a moderate charge of this extraordinary substance, that in a few days he should be possessed of double muscular force and powers of exertion, and become an irresistible adversary. Hens may also be so stimulated as to lay eggs all the year round. Its great attribute as an aphrodisiac leads me to suppose, that it is the principal exciting basis of sexual affections. At the time of pairing all animals seem to be more than usually charged with it, as appears by the brilliancy of the eyes, the florid and bright colour of the parts clothed with a thin pellicle, as the lips, and the combs of poultry, and the great rage and force with which animals are at this season possessed. This is usually in greater secretion or combination in the spring of the year, when the sun begins to exert its power in the atmosphere after a period of abstraction: and it is at this season that consumption puts on its worst and more rapid advances, whose subjects have long been discovered to have a singular and morbid tendency this way.

B. In cold rheumatic pains and the aches of a debilitated frame, it acts like the genius of relief,

by the warmth and comfort it instantaneously diffuses. In that half paralytic state of the lower extremities so frequently met with, especially in such as have been enervated by residence in a hot climate, or exposed to severities in a cold one, it gives vigour and restoration in a magical degree. Its powers are not less effective in nervous affections, or where the vigour of the constitution has been exhausted by laborious exertions or exceses. In those distressing paroxysms of asthma, brought on by a humid or deoxygenated atmosphere, it brings instant alleviation: and in all these and most chronical complaints, it may be as safely taken internally as bark or port wine, and used in lotions externally. By numerous illustrations might these assertions be exemplified, without danger or even inconvenience.

A. This noble remedy is even capable of prolonging life beyond the natural period. Professor Leroi administered it mixed with distilled aromatic waters to an old gentleman more than seventy-eight years of age, in whom life seemed to be almost totally extinguished. By its exhibition in the quantity of a few table spoons full every day, the dying embers of life seemed to be illuminated, and he survived seven years, after an attack of weakness in which it must have seemed absurd and injudicious to attempt to interfere.

B. Its properties are cordial, soothing and sedative, much like wine, opium, or Hoffman's anodyne, and to be highly applicable in cases where the arterial action of the whole frame is nearly exhausted. But it is time to return to the subject of our previous discussion.

A. There is a constitutional disease of the bones, which has of late years either extended its influence, or has been brought more into notice, and of the pathology or remote cause of which very little conjecture has yet been formed. I mean the mollity or softness of the bones. It appears to be almost exclusively confined to males, and seems in some way analogous to consumption in females, and rickets in children. It makes its appearance at about the same period of life, or often earlier. The bones of the limbs first become gradually softened, especially the legs, and lose their consistency, so that they are unable to support the body for any length of time: soon after this the legs become bowed, and the bones distorted, and this affection creeps gradually through the whole series, reducing the sufferers to melancholy and helpless objects. This flexibility at length in a manner indurates, but the bones are left a mere cellular tissue, in a state so thin and brittle, that they snap and break with any considerable exertion. I have seen a young gentleman whose limbs were so extremely fragile, that even by getting up quickly

from a sofa, and putting his foot hastily to the ground, his thigh has been broken.

B. It seems to originate from some vitiated state of the materials of ossification, and has been attributed to an acrimonious defluxion upon their substance.

A. This is a common and convenient solution to any of those affections which are called humoral. It was once believed that consumption was caused by an acrid defluxion from the treachea or windpipe upon the lungs: and it is yet thought by many well meaning and grave practitioners, that catarrhs and expectorative colds are occasioned by a substantial and actual defluxion from the head upon the chest. But in the disease we speak of the fact is simply this. There is a deficiency of phosphate of lime, the great material of their basis, which as the bones enlarge, renders them weak in proportion to their bulk, and keeps them in a soft and almost flexible state. The phosphoric acid must therefore be in an undue quantity, or diverted into an altered determination in consequence of irregular union, leaving the earthy part, which is secreted to its proper point of deposition, and which by its combination should form an indurated and compact bone, in an imperfectly formed state; or the earth being in a state of solution may be

absorbed and deposited in other parts of the system, or carried off by the several secretory organs. The deficiency of this acid may also be commuted by the formation of carbonic acid, in consequence of a prevalence of carbonate of of soda, which is decomposed by the lime of the bones, and produce the same effects. When this latter is the cause, the bones become gradually decomposed, and leave the frame a mere misshapen mass before dissolution. Bebe, the celebrated French comedian, had this disorder in such a manner, that he was able to distort and dislocate his limbs so as to become a frightful spectacle. Having once exhibited himself in this state before the king, he was ordered to be taken to his own surgeon, who not having a knowledge of his person, commiserated his shocking condition, but declined any professional interference in so hopeless a case.

B. A remarkable case of this kind became lately the subject of a singular juridical inquiry. Mr. Wm. Brown, a person occasionally afflicted with fits of insanity, was committed by his friends to the care of Mr. Bell, the licensed keeper of the asylum for lunatics, near Lancaster. Of his ultimate recovery the attendants seemed to form very little hopes. In this asylum he continued eighteen days, when complaining that he was ill and dying, and his reason appearing to be

much restored, he was conveyed home. In getting into the coach he complained much of pains in the back, and on the road told his brother that his ribs were all broken except two: after being put to bed he seemed very uneasy, and in apparently great agony called out to his brother that his breast-bone was broken; and upon being questioned as to the cause, charged Bell with having done it. Upon examination while he was in bed, it appeared that five of the ribs were actually broken on each side, and that the upper and lower parts of the breast-bone were completely separated. In this shocking state the unhappy man lay nearly five days, seeming quite sensible he was dying, and calmly expired. Upon this evidence and these appearances poor Bell, a man of unimpeached good and humane conduct, and without any assignable motive for such needless and unnecessary brutality, took his trial for the supposed murder. Dr. Wynstanley, the physician to the asylum testified, that on the day before he was taken away by his relations, he was in his presence stripped and stood upright, which he thought would have been impossible if his ribs had been broken; nor did he think it possible that the deceased could have lived four or five days in the state he was described to have been. He with several surgeons attended the opening the body, and had no doubt but that his death was occasioned by the injury

he had received on his chest: but how the deceased came by the violence, or what were the causes of these appearances, neither himself nor any of the medical persons who were examined could form a judgment, though the whole mass of the bones appeared to be in an unsound state. Upon these facts and this evidence poor Bell had nearly been hanged; but his previous character for gentleness and humanity, and the known hatred and antipathy which deranged persons have for their keepers, acquitted him.

A. This was nothing more than a case of softness or fragility of the bones accompanied with dereliction of the reason, occasioned by their decomposition for want of phosphoric acid to indurate and strengthen them, and which became gradually less firm, so that the very agitation of the coach in conveying this unhappy patient home caused them to break or separate. In childhood this disorder is called rickets, and is precisely of the same origin. The temporary insanity of Mr. Brown, as in all similar cases, was caused by the developement of carbonic acid, in consequence of the carbonate of soda uniting with the calcareous earth of the bones.

B. It is now a well ascertained fact, that when the bones are thus softened, the phosphate of lime is secreted into the arteries and from them

conveyed into the kidneys, whence it passes by the ureters into the bladder, and being held in solution is carried off with the urine. And it is likely that the turbid urine of gouty persons and others peculiarly affected may hold a solution of earthy particles. The absolute absorption of calcareous earth from the bones is now no longer a doubtful theory, nor that it may be secreted by the lymphatics, and not only deposited in many anomalous forms, but even in this way carried out of the system. To effect this, they must have been previously softened from a deficiency or loss of some of their component parts, and afterwards so far dissolved as to be subject to the capillary attraction of the vessels. During this affliction it is sometimes observed, that the urine deposits a whitish sediment which on evaporation resembles mortar. And the bones of the leg have in this disease been reduced to the thickness of a wafer. It is also a reasonable conjecture, that many diseases of the kidneys may be caused by the lodgement of calcareous matter, causing their gradual wasting, or suppuration and ulceration Are there then any probable ways by which this loss or waste of phosphate of lime may be restored, or this excess of carbonic acid be diminished?

A. There can be no doubt but that both these intentions may be readily effected, and that by

steady application these unhappy disorders may be much relieved, and in most cases completely restored. Calcareous phosphate may be taken internally, and by being really transmitted through the lymphatic passages, contribute to ossification, and the predominant acid, which causes this want or waste, be decomposed by small doses of the mild alkaline salts. Mr. Stephenson, a young gentleman of great personal endowments and elegance of manners, was seized with this malady in his thirteenth year. The exercise of walking became painful to him, his legs began to bow from the weight of his body, his chest protruded, and once by striking a ball violently with a racket he broke his arm. The usual means of exercise, bathing, bark, and other popular remedies had been in vain administered before I saw him. At this time the disorder was making a slow but steady progress, I directed proper compresses to reduce the curvature of the legs, and gave him twice a day small doses of phosphate of lime in powder, with occasionally half a drachm of phosphate of soda. At the same time I used a warm lotion of subcarbonate of kali dissolved in water. By a regular perseverance in these simple means the bones became gradually indurated, and he is now upright in his figure and firm in his step, with a capability of enduring severe exercise and fatigue.

B. The valuable uses of the phosphates of lime and ammonia, are abundantly exemplified in their slow but certain effects in reducing wens and scrofulous swellings of the glands, by means of burnt sponge and other similar substances, and in relieving that species of ophthalmy, or soreness of the eyelids, evidently of scrofulous origin. Some poisons also seem to act specifically upon the bones after this manner, and destroy their solid consistency. Among these, one of the most violent is the venereal virus. Fracastorius, and the early writers upon this disease, give grievous accounts of the lamentable condition of persons soon after their infection. This virus seems to be a peculiar acid, which by absorption attaches itself to the earthy parts of the bones, rapidly dissolving them and reducing them to a foul carious mass, as in the corona veneris, loss of the nose and palate, softness and nodosities of the legs. But this disorder seems nearly to have run its race, and to be happily declining very fast. In a few generations more, I may venture to prognosticate that in these climates it will not be known.

A. Caries of the teeth is a decomposition of the carbonate and phosphate of lime of which they are formed. It first makes its appearance upon the enamel, which is a kind of phosphoric glass, and becomes deliquescent upon its combination with

any of the animal acids by absorption. It does not appear that the external oxygene of the air has any effect in this dissolution and decay; for if a tooth be drawn and instantly replaced in the socket, all further decay ceases, in consequence of the connexion with the generel system being broken. In the museum of Dr. Tuke of this city, is the skull of one of the Roman dragoons, discovered in the stocks of the guard-room upon the opening of the ancient city of Pompæia, and which is now nearly eighteen hundred years old. The teeth which remain in this curious relict of mortality, are now as perfect as when this soldier was living. And my venerable friend Captain Gunthorpe, who brought home this remnant of antiquity, having at that time accidentally lost a tooth, replaced it by one from this very skull, and I believe has it now in his head. An alkaline lotion, and a powder made of burnt sponge and charcoal, will not only preserve the teeth sound, but give them a beautiful milky whiteness.

B. Consumptive and scrofulous persons have generally the teeth remarkably sound and perfect; very likely in consequence of the action upon the phosphate of lime in different parts of the body, leaving this portion of the bones free from its influence. It seems something singular that the hardest, and apparently the most dura-

ble part of the animal frame, should be the first to decay.

A. Many scrofulous affections, especially such as are accompanied with osseous irregularities, must be connected with a deficiency of phosphate of lime, or an undue diversion by metastatic deposition. This is singularly manifest in that extraordinary species of exacerbated scrofula called cretinism, and which has so close an affinity with the rickets of our own climate. Dr. Reeve, who had an opportunity of examining the skull of a cretin, found that although he was thirty years old when he died, the fontanelle had not yet closed, the second set of teeth were not out of their sockets, and that none of the bones were distinctly or completely formed. The head was large but the face small, and it had the appearance of the skull of an adult joined to the face of a child; and every part bore evident marks of deficient irregularity in the growth and structure.

B. There is now, I understand, a young woman of the name of Jane M'Brian, resident in a townland of Breachon near Belnamallard, who is at present in the twenty-third year of her age. She is only three feet high, quite childish as to her mind, and taking delight only in the most infantile amusements. Her teeth are not yet

shed, and it is probable that the bones of the head partake of this deficiency of complete formation. In these cases, as well as in rickets, the brain seems to be of sufficient capacity, and even proportionately larger than in sound subjects; nor has any irregularity of structure or morbid organization been detected in any part of the nervous system: yet there is a fatuity and imbecility of intellect proportionate to the want of osseous completion, both in cretinism and in rickets. In a general softness of the bones, in rickets, and in many varieties of scrofulous affection, I have always observed that the fontanelle remains unclosed for a much longer period of time, and the teeth are slower of protrusion. This is a marked criterion, by which much judgment may be formed of constitutional tendency to these complaints. It may nevertheless be concluded, and generally detected, that this deficiency of phosphate of lime has in some state and by some combination been diverted by absorption into other channels.

A. There are only two ways by which a solution of these appearances can be offered. The materials necessary for the completion of ossification are in deficient quantities, or they have been carried into undue and morbid secretion. In consumption it is evident that there is a sufficient and often a superabundant supply, and

that even the ribs themselves are robbed of their substance to form these depositions. In scrofula they seem to be gathered to the muscular and glandular parts by secretion, and produce sores and languid ulcers. All these sores appear to be of an alkalescent tendency, from the great power which acid pultices and fermented cataplasms have over them.

B. Distortions and weakness of the spine, where the bones of the back are in a state of solution from insufficiency and loss of their earth, causing paralytic debility and often the most painful caries, wasting and consuming the sufferer in hopeless and lingering misery: white swellings, diseases of the hip-joint, and some others where the bones become carious, partake much of this nature; for it appears that they become hollow and spongy, deprived of a portion of their essential parts, and are left a mere shell. Most of those who die from these complaints die hectic, from absorption of the diseased accumulation and its deposition on the lungs. One of the characteristics by which tubercles on the lungs are distinguished from catarrhs and other affections of the chest, is the specific gravity of the expectorated matter.

A. This mark, by which most practitioners form their judgment, is under certain circum-

stances much to be depended upon; though the reason commonly given for its suddenly sinking in water, that it consists of a broken portion of the body of the lungs, is not quite satisfactory. The lungs themselves, from their porous and spongy texture, swim on the surface of water, even when they are deprived of vitality. Now the expectorated matter consists of small round shot-like lumps, which upon examination consist of phosphate of lime in a soft state, mixed with purulent mucus, which being of greater specific gravity than water sink instantly to the bottom.

B. Inflammation of the lungs then, differs nothing as to its remote cause from the inflammation of a gouty limb; both consisting in the undue absorption and local deposition of calcareous matter.

A. It has often occurred to me, that many of the chronical complaints peculiar to European climates have a close alliance with each other, and with some variation as to symptomatic effects spring from the same foundation: and that it is the mere aggregation of symptoms affecting peculiar organs or faculties, which give them a fixed and specific name. The interchangement of many of these, and their occasional transfer from one disease to another, in no small degree seems to

countenance this supposition. That diathesis which is commonly called scorbutic, has many affections in common with consumption, and often terminates in ulceration of the lungs. All writers have agreed in this near affinity, so near, that they mention two distinct varieties, one scrofulous and the other florid; although no precise definement or specific distinction is made between them; and although they both proceed in the same manner, from inflammation to expectoration, and from expectoration to ulceration. Even Dr. Beddoes confounds scrofula with scurvy, and contends, that because consumptive persons have never bloated and livid countenances, inflamed and bleeding gums, and other appearances of what he calls deficient oxygenation of the blood, they cannot therefore be scrofulous.

B. Scrofula or king's evil is a genuine idiopathic hereditary disease, with characters distinctly and unalienably marked. Scurvy is always accidental, and ought to be applied exclusively to that kind so common in closely pent up garrisons, and ships badly victualled, where the provisions consist entirely of old salted stores: for this disorder, I believe, originates entirely in the excessive internal use of muriate of soda or common salt; nor have I ever found it the mere consequence of bad air, stale unsalted food, unhealthy

soil, or any other causes of corruption to which it is usually attributed. It would else be alike common to the foul and close departments of cities where these causes sufficiently abound, and where all the diseases of foul air, bad provisions and clothing, and every effect of filth, want and putreseence are miserably predominant.

A. Among the poorest classes in sea-port towns, this disease is common for obvious reasons: their food consists mostly of salt fish, old ships' stores, and the provisions natural to the trade of such places. And the respectable and learned writers upon this subject, such as Lind, Pringle, and Trotter, who from their official situation have constant experience of its appearance and progress, have hence been led into the error of attributing it to foul air, corrupted blood, poor diet, and the nature of the soil and atmosphere. Having no professional opportunities of looking beyond the circle of the navy, the army, sea-ports and their hospitals, their disciples will be surprised at the assertion, that it is no where else to be found, except accidentally from the same cause, and they may seek for it in vain in the wildernesses of Scotland, the mountains of Wales, or the swamps of Ireland.

B. Sometime since I was requested to examine three children of from twelve to fifteen years old,

who were evidently suffering under confirmed and distressing scurvy, with bloated pale countenances, bleedings at the nose, offensive breath, fungous gums, large livid blotches on various parts of the body, great lassitude and unwillingness to use any personal exertions, with a constantly lax state of the bowels. Surprised at these appearances in a cleanly and well fed family, I was much more astonished, when upon inquiry I found that the food had consisted entirely of fresh meats, vegetables, milk and bread. Unable upon any reasonable principle to account for the state of my little patients, I casually cast my eyes upon a salt-box, hung up near the fire for the purpose of keeping it dry, and within the reach of them all. Upon strict inquiry I found, that they had each of them been for a long time in the habit of taking out hands full of salt every day, and eating it. The salt-box was instantly removed one yard higher, and the children shortly recovered their usual health and activity.

A. An injudicious and continued use of salt water will in like manner bring on scurvy. Muriate of soda, when taken in large quantities into the stomach, is decomposed by the phosphoric acid, and forms a phosphate of soda. The blood is consequently deprived of one of its chief agents of activity and purity, by a con-

sumption of that power which should enable it to receive its proper quantity of oxygene, and becomes deep-coloured, deficient in vitality and heat, causing general lassitude in all the organs connected with it, and over the whole frame. The discoloured blotches on the skin in this and other diseases where the blood is deficient in its proper quantity of oxyphosphorescence, are occasioned by great langour of the extreme capillary vessels, by which a portion of their contents are prevented from returning into the general circulation and become stagnant, exactly like the black and blue marks left on the skin after these very fine vessels have been bruised by blows.

B. Scrofula depends upon actions and relations totally distinct, and whatever may be its remote cause, it seems to influence not only the organs of the body, but the energies of the mind. Its immediate connexion with consumption is in every point of view palpable and evident, and their interchangeableness with each other every where strongly marked. This disorder, together with rickets, idiotcy, and softness of the bones, has within a century much declined; but it is equally demonstrable that consumption, asthma, and gout have proportionately increased.

A. The frequent mutation of one disease into another must suppose that connective relation

which announces a derivation from the same cause. Instances fully sufficient for illustration must constantly occur to the observation of the considerate practitioner, of scrofula changing to consumption, and of consumption being suspended and cured by the external appearance of scrofula. An abscess of the lungs appears to differ very little, except in locality, from a scrofulous sore upon any of the glandular parts. The parents of the lady whose name we have before mentioned, had five children, all distinguished for their personal attraction. Before the age of twenty-one, four of them died consumptive. The second son, a remarkably fine young man, is still alive. At about the age of twenty, he began to show manifest signs of being likely to follow the same unhappy fate; but a scrofulous eruption breaking out over his face, every unpleasant symptom tending to the chest suddenly ceased. This eruption has ever since continued in a greater or less degree, and during the time that it is in full erubescence his health is sound and perfect: but whenever from any cause it disappears, he is attacked by a short cough, stricture on the chest, dry hot skin, which is only relieved by the re-appearance of the purplish blotches on the face. With this gentleman, who was bred to the medical profession, I have had many interesting conversations on the subject, and he is so thoroughly convinced that the dis-

appearance of this efflorescence from cold or any accidental irregularity will be fatal to him, that with an heroic resignation to the consequences, he has arranged all his affairs, having as he observes, whenever this shall take place, but a short time to live.

B. This metastasis, or translation from the interior organs to the skin, is frequent enough, but it has not been enough made the object of reasoning and practical application. The popular dread of striking in a rash must have been founded, like most traditional sayings, on continued observation. Rachel Thomas, a young woman of very fine person but delicate health, was declining fast in an affection of the lungs. Having one night perspired profusely, she was the next morning covered with a scarlet pimply eruption over the whole body, which continued for ten days, accompanied with violent and troublesome itchings. From the first appearance of this eruption her cough ceased, the breathing became free, the pulse slow and steady, the skin cool, and by the use of restorative food she in a short time regained her health and strength.

A. A few years since I was called upon to endeavour to give relief to a young lady, who was much disfigured by a foul and unsightly efflorescence over the face and neck, which occasion-

ally broke out into sores discharging a thin corrosive sanies. Miss Davy, just entering into public life, and in the possession of a splendid fortune, was naturally desirous of getting rid of so disagreeable a species of deformity. Suspecting at first that it was occasioned by a previous inflammation of the stomach, from the usual cause of drinking cold water after being heated by exercise, I endeavoured to repel it by absorption. For this purpose I directed her to hire a cutter, and lie at anchor for three days in a rough and broken sea. The stomach was consequently kept in a continual state of inverted agitation, and on her coming on shore, we had every reason to congratulate ourselves on the prospect of the happiest success. The eruption had in a great measure disappeared, without any apparent injury to her former good health. In a few weeks however, the complaint returned with unusual violence, and I began to perceive that it was connected with the general system, and cautioned the young lady to be very guarded as to the means she might be recommended to relieve it, lest, as I was apprehensive, it might by injudicious repulsion be transferred to the lungs. Impatient of a personal deformity, and probably incredulous of the dangerous consequences pointed out to her, she applied to various practitioners without success, and at last removed herself to Clifton. In three months the eruption was

completely removed, and in less than three months more she died consumptive.

B. It has been seen in the affection called cretinism and in softness of the bones, that scrofula is much connected with imperfect formation of the bones, either from a deficiency of osseous matter, or as in consumption and gout, an absorption and irregular deposition of this material. It is by no means uncommon to see scrofulous subjects with the bones of the nose and the palate, and sometimes portions of the skull, either partially wasted or entirely wanting.

A. In scrofula it is probable that phosphate of lime has never been sufficiently supplied, from a want of one of its necessary component parts: and that another combination has taken place, productive of the evils attendant on this affection. Phosphorus does not seem to be wanting, from the florid skin, vermilion lips and tongue, and penetrating eye, generally observed in scrofulous persons. Calcareous earth must therefore be in undue quantities, in consequence of which the phosphoric acid gradually attaches itself to the gelatine of the muscle and the glands, causing those slow ulcers, which either proceed to languid suppuration, or constantly discharge a thin corrosive ichor.

B. Cancerous indurations seem to be morbid accumulations much related to some affinity of this kind. Those which take place externally, are generally the consequence of accidental interruption of glandular or muscular secretion, by which semiosseous aggregations take place in a gradually ramified manner, and which by the rapid collection of this morbid combination, produce at last burning ulcers, the discharge from which is of so corrosive a nature, as by continually eating away the edges, to enlarge these painful and generally fatal wounds. Little hard calcareous nodules, and irregular pieces of bone, have sometimes been thrown off with the discharges, which are a carbonate or phosphate of lime. In every case which has occurred to my observation, I have easily detected a strong tendency to scrofula. Females are mostly the subjects of this disease, which is apt to make its appearance soon after the natural discharges have ceased.

A. Internal cancers, more particularly uterine ones, approach still nearer to ossification. In some cases the whole of the uterus and the surrounding muscles of the abdomen have been completely ossified, the divided sides appearing of a chalky white brittle nature, the bottom converted into perfect bone, and the body not unlike the thickest part of the human skull.

Detached and irregular pieces of bone have likewise been found; and the symptoms previous to these formations have been precisely similar to fits of the gout. Women are confessedly more the subjects of cancer than men: and these facts seem to illustrate and justify a former hint, that the emmenal discharges are the natural vent for the superabundant supply of the materials of ossification.

B. The discharge of bony fragments from cancerous sores, especially such as are seated on the breast, is a circumstance sufficiently obvious to every practitioner; but their pathological history is by no means satisfactorily accounted for. Are they exfoliations from any of the surrounding bones in consequence of caries?

A. As far as our anatomical knowledge of this miserable disease can instruct us, this supposition is not by any means justified. The ulcers seldom extend through the whole glandular substance of the breast; and these bony portions seem to be osseous aggregations synthetically formed, independent of contact with the bones of the ribs, the collar-bones, or the chest. The breasts have been cut off after the discharge of these painful masses, without the appearance of any existing or connecting caries to suppose them the produce of exfoliation. They are

therefore formed like the calcareous substances expectorated in asthma and consumption, by a chemical combination of their essential components in the system. And althogh the adjacent bones be not absolutely carious, so as to throw off a direct portion of their substance, they may nevertheless be found partially decomposed and defective, in consequence of an attractive secretion of their earthy parts from a superabundance of the phosphoric acid, by the union and saturation of which these substances are formed. In scrofulous suppurations of the glands of the neck, pieces of bone have been sometimes found in the ulcer, which from the spongy and decomposed state of the adjacent jaw bone, have been formed by an absorption and deposition of their earth in these glands, and the exciting cause of the inflammation and consequent ulceration.

B. The Rev. Dr. Ford, ordinary of newgate in London, is in the habit of reducing gouty inflammation of his feet by means of leeches. He observes that the leeches invariably die after being saturated, and that the discharge which follows is of so caustic and acrid a nature, as to corrode the skin over which it has flowed. These discharges, like those from cancerous ulcers, may be the component parts of phosphate or carbonate of lime, as yet imperfectly combined, and which by a more complete maturation

and deposition would indurate and become osseous matter. It appears that they possess the qualities of any caustic alkalescent solution; whence the beneficial effects of oxymuriatic and carbonic acid gases, in decomposing and rendering them less foul and corrosive.

A. In searching after the remote cause of that species of asthma, whose paroxysms are so distressingly oppressive, where the periodical fits terminate in frothy or viscid expectoration, or are carried off by recession and absorption, it has occurred to me that the diaphragm or else the membrane investing the lungs is generally, or during the presence of the fit, thickened by the secreted deposition of some material of this nature. In old asthmatic persons, it frequently happens that they expectorate a hardened mucus, much heavier than water: and in some instances it has been so completely ossified, that small pieces of bone, or phosphate of lime, have been found mixed with the mucus. At every age, and in most chronical diseases, may be observed a tendency to the production and formation of ossification, in all its combinations and varieties.

B. Asthmatic paroxysms often terminate in symptoms much resembling fits of the gravel; with pains in the back and loins, a large discharge of urine accompanied with a deposition of mi-

nute calcareous particles, and instantaneous freedom and ease. This calcareous emission will appear to be indurations of phosphate or carbonate of lime, taken up into the system and carried off by this natural evacuation. Calculi in the bladder are compositions of this aggregate material, gradually collected and indurated, in consequence of their containing a larger portion of acid and animal matter.

A. There is a species of scrofulous ophthalmy, which it is usual to call inflammation of the eyes, but which in fact is only an accumulation and discharge of purulent mucus formed in the eyelids and their corners. This discharge, by coming in contact with the air, and having its watery parts evaporated by the heat of a warm bed, inspissates to such a degree as to render the lids extremely difficult to open, till they have been moistened by warm milk or water. The origin of this affection is, like most other scrofulous sores, a decomposition of the sebaceous matter contained in the glands, caused by the loss of the alkali necessary to produce fat, and its conversion into an acrimonious fluid. This alkaline earth can only be lost by decomposition, which is probably effected by a secretion of carbonaceous or phosphoric matter and its necessary formation into an acid. The general inefficacy of the usual topical applications is consequently

apparent, except in affording temporary ease; and the great utility of blisters, issues, and setons, as near to the part as they can be applied, by which the discharge is drawn to and vented in a less inconvenient part of the body.

B. This disease of the eye-lids, or rather of the sebaceous glands, differs from every other kind of ophthalmy, chiefly in its having no previous inflammatory stage, and in not being accompanied by the severe pains attendant on acute and accidental affections of these organs. There is a remarkable similarity in the bright scarlet colour of the eye-lids in this complaint, and the lips and wounds of scrofulous persons. It is doubtless chronical, constitutional, and a decidedly marked character of a scrofulous habit.

A. Rheumatic pains and the aches of old age take place mostly in subjects of a thin and emaciated muscle, where the animal oil is decomposed, and the muscular fasciæ more exposed to rigidity and gradual ossification. The joints also are much affected with pains analogous to the gout. By repeated attacks the muscles and their tendons become rigid and contracted, the bones of the joints become gradually enlarged and prominent, and occasionally a mucous sanies is deposited, not unlike the discharge from scrofulous sores.

B. Chronic rheumatism, and also irregular lumbar and sciatic pains are from this source, the slow deposition of osseous matter producing gradual rigidity, and at last complete induration. This process is precisely similar to that which takes place in petrifactions or stalactitical incrustations. In the dissection of very aged subjects it is common to find the ligamentous parts between the joints of the back entirely ossified, by which the whole series of the vertebræ and their connecting ligaments are assimilated into one entire rigid bone.

CONSULTATION V.

A. It is a very natural transision to inquire, how far the opinions we have formed of the origin of some chronical complaints, may be applied to the developement of the theory of gout. After the ingenuity of all the learned in this department has for so many ages been exercised, it is, I confess, a degree of temerity to venture upon a discussion with the appearance of opposition to long established doctrines. Yet, as the many rapid advancements in the sciences, parallel with and so clearly allied to physiology and medicine, have necessarily extended their influence to these subjects, and as all former speculative systems for the disclosure of this great and interesting secret have been hitherto unsatisfactory, or abandoned as unsafe, reason may still be considered as open to the adoption of opinions more consonant to the present enlargement of general knowledge.

B. Darwin thinks that the liver is the organ primarily affected, the disarranged functions of which are communicated to the muscles and the joints, and sometimes to the stomach and head. But to suppose that the absolute deposition of calcareous earth, is in any remote manner produced by torpidity or inflammation of the liver, is surely below paralogy, and wants not the help of much logic to controvert.

A. The material deposited upon the joints after regular and successive fits of the gout, is a true carbonate of lime, or lime saturated with carbonic acid, with a greater or less proportion of phosphate of lime, as the phosphoric acid may be more or less abundant. It differs only from the concretions we have been reasoning upon, in its having a greater proportion of carbonic acid for its basis. This acid it has been usual to call the lithic, but I must confess I know not the specific difference or relative affinities between this acid and the carbonic, except that it holds a larger portion of nitrogene, with some small quantity of hydrogene.

B. It is almost by the common consent of physiologists that this disease is called hereditary, and inasmuch as predisposition to peculiar habits of organic action, and idiosyncrasy of temperament may be called hereditary, this affection may be so considered. But this must be regarded with a degree of cautionary reserve. It has been before remarked, that constitutional tendencies descend, even where these tendencies have been excited by parental irregularities. But as these aberrations are rather the errors of habit than of original formation, they gradually lessen, and at last disappear, by the avoidance of the previous exciting causes. But it naturally happens, that the same modes of life continue from father

to son; and that he that has by his method of living contracted a gouty habit, will leave with his possessions the same habit to his inheritor. So far, and no farther, may gout be said to be hereditary.

A. Regularly formed and settled gout is a gradual deposition by absorption of carbonate of lime, mostly tending to the joints of the extremities, occasioning periodical inflammation, and the usual train of symptoms which constitute what is called the regular fit. This carbonate of lime can only be formed by the undue secretion of the earth, and its saturation with carbonic acid, and more or less of the phosphoric. Whatever therefore contributes to the superabundance of these acids is the remote cause of gout. Observe the series of symptoms which precede and attend its attack. First a langour and dejection of spirits, and that sense of coldness which always accompanies rapid secretion and absorption, much like what is felt during the suppuration of an abcess, or by young persons after a meal. To this succeed the intolerably aching pains of debility and deficient action, generally on the joints or the organs mostly weakened by previous affection. These are followed by inflammation consequent to the rapid accumulation of irritability, during which, I suppose, the morbid accretion takes place, not immediately in its

indurated state, but which is gradually hardened by time and repeated attacks. These symptoms, with a longer or shorter duration of their paroxysms, and more or less accompanied with disarrangement of the digestive organs and the bowels, constitute a complete fit of the gout.

B. To this simple illustration an objection or two will naturally occur, which it may be proper to resolve, upon principles corresponding with these ideas and the general laws of animal economy. These are its occasionally sudden attack; its rapid transition from one organ to another, and the immediate relief caused by its removal; and the many irregular forms it puts on. Are these reconcileable to the principle of a decided and fixed accumulative obstruction in particular parts?

A. These are objections of some difficulty; and if we fail of demonstration in points which the collective ingenuity and learning of mankind have hitherto not explained, we have only not done that which has yet been not attempted. The power of metastatis, or the translation of morbid affection from one part or organ to another, for the purpose of its eventual relief or expulsion, is one of the most beautiful efforts of benevolent nature to assist her intentions: and the discerning and skilful physician will never

fail to apply his art to the furtherance and fulfilment of its operation, by directing these attempts to their best ends and effects. One of the most dangerous periods of gout is that cold stage, attended with aches and distressing languid pains, occasioned by torpid and deficient action. These pains naturally fasten on parts already weakened by exhaustion. They come on suddenly, like those pains in the cheek, head, stomach, or bones, which are so commonly occasioned by colds, and like them are as rapidly transferred from one part to another, and often as suddenly disappear. This accounts for the instantaneous relief given by the administration of a warm cordial, where the pain or spasm is in a moment either removed or transferred from the stomach, head, back, or bowels, to the extremities. These circumstances therefore happen only before the fixed stage is set in, and do not actually constitute the disease, but are merely incipient symptoms always attendant on the disarrangement of organic action from whatever cause, and are alike felt at the commencement of fevers, small-pox, and common colds. And it is these in their different varieties which form the anomalous shapes of unsettled gout, and its great resemblance to many other disorders.

B. This disease then is mostly found, where a long and regular habit of receiving into the sys-

tem a quantity of carbonic acid, which in addition to the acid already formed, produces a tendency to these calcareous depositions, by a supersaturation of the earth with these acids. For this reason the regular drinkers of fermented liquors, particularly such as are charged highly with carbonic acid, as wines of all kinds and cyder, are the principal, if not the exclusive objects of gradual gouty affections.

A. No popular opinion is perhaps more founded in error than the common notion, that gout is the privileged inheritance of the high liver, and that its chief cause is an indulgence in rich food, ease and luxury; except inasmuch as these habits suppose a free use of wines and fermented drinks. I think with Darwin, that man may fearlessly and indiscriminately make use of whatever kinds of food, and in whatever quantities the stomach will bear, without danger of producing gout, dispepsy, or any of the train of diseases supposed to be the effects of indulgence and gluttony. Exercise is no doubt salutary, inasmuch as it promotes perspiration, and by this means discharges the superabundance of water formed in the system, and with it some of the morbid gaseous fluids. In cyder countries the lower orders of people, in a nearly equal degree, suffer from gout, rheumatism and gravel, as the wealthy. And the difference in degree is merely, that in

addition to the acid taken with the food as a common beverage, they have not the use of wine, and are necessarily more laborious. It is a remarkable circumstance, that in cyder countries, the pigs which feed on the must or bruised fruit, which is thrown out in heaps after the juice is pressed from it, and very soon ferments, have regular gout in the joints. In the neighbourhood of Bristol great herds of swine are kept, which are chiefly fattened on the grains from the distilleries, and which by being amassed together acquire a state of acid fermentation before they are consumed. These swine I have often seen in a state of intoxication, many of them with the feet swollen and inflamed, and so tender as to be unable to stand upright, or moving with the most painful efforts, and evidently in the agonies of a gouty fit.

B. Besides carbonic acid, fermented liquors contain a large portion of oxalic acid, which makes it probable that the depositions formed in consequence of a continued use of these drinks, are a combination of the phosphates, carbonates, and oxalates of lime in indefinite proportions.

A. Much has been said of the mischievous effects of an intemperate use of wine and spirits; but the subject has hitherto been considered only in a moral and general view, without a reference

to their physiological and chemical action. Wine, as containing a larger portion of carbonic acid and oxygene, acts in moderate quantities as a noble cordial, by bringing into increased action the fundamental powers of life and animation, an union of the phosphorus of the system with its oxygene. To this succeeds a state of placid and agreeable exhaustion, similar to those delightful sensations which are felt upon being conveyed in an easy carriage after a tiresome walk, where the irritability excited by previous exertion is gradually carried off by a lesser degree of exercise. Excessive indulgence produces intoxication by charging the system with an abundance of carbonic acid, creating confusion and debility, in no manner differing from an overdose of this deadly power in any other way. All the effects of intoxication are felt by imbibing the fumes of any liquor in a state of fermentation, or in the act of discharging its carbonic acid. Spirits act in the same way, but holding less oxygene and oxalic acid, and more carbon, do not produce the same exhilaration till the quantity has been increased to a nearly inebriating effect. This renders the abuse of spirits more immediately dangerous than the use of wine. The regular drinkers of wine, however, are more the subjects of calcareous depositions and ossifications, such as gout, angina pectoris, gravel, rigidity of the muscles and tendons, and general prostration of the powers of life.

They have accumulated an actual material of disease, which no habit of late temperance will entirely remove. The drinkers of spirits, whatever temporary diseased actions they may have incurred by long irregularity, yet having received into the system less of this morbid agent, are upon complete recovery by temperance left more free from these mischiefs, and are reinstated nearly in their previous and unalloyed standard of health. Gout, in all its varieties and shapes, is the inheritance of him who accustoms himself to a too liberal use of wine; dropsy, jaundice, and general cachexy, or bad habit of body, of him who commits continued excesses in the use of spirits.

B. It is not however hence to be concluded, that gout is invariably an acquired disease. The combinations necessary to produce it may exist in sufficient abundance in the constitution, and like the posphate of lime in consumption and asthma, accumulate into morbid depositions. In either case we see the improbability of completely eradicating a disease which has gathered by slow osseous aggregation, and the danger of too suddenly interrupting actions which ultimately tend to the regular termination of the fit. Means may nevertheless be safely used to lessen its violence, and shorten its torments. By the use of small doses of alkaline salts, especially the sulphate and

phosphate of soda, upon the earliest appearance of gouty symptoms, the predominant acid may be decomposed and carried off, by perspiration, by the bowels, and by the urine: by warmth, and moderate and appropriate cordials in the stage of painful languor, debility may be relieved and comfort administered: by the promotion of perspiration the fit may not only be shortened, but its anguish alleviated. By attentions of this kind watchfully and skilfully administered, this painful affliction is not only rendered less formidable and severe, but the fits lessened in the frequency of their recurrence.

A. The most distressing and most frequent forms of unsettled gout are dyspepsy and heartburn, when the acid is formed in the lower portion of the stomach. This is frequently relieved by spontaneous diarrhæa, in consequence of the acid being neutralized by a due mixture with the calcareous earth, thereby forming a natural saline composition. Hence the unpleasant eructations always accompanying this affection, caused by the escape of carbonic acid or hydrogene gas. Sometimes the acid is so predominant, or the alkaline earth so deficient, that this natural effervescence does not take place, and the stomach is constricted, the bowels obstinately costive, and by a ong continuance of this malady, the coats and even the substance of the stomach itself may become gradually indurated or partially ossified.

B. This symptomatic variety of the disease may be safely removed without fear of constitutional danger. The methods commonly made use of for the neutralization of this acid must consequently give only temporary relief, by removal of the existing paroxysm. To effect a complete eradication, a system of diet must be undertaken conformable to principles of this kind. For many years I was myself troubled with this continually teasing disorder. By the slow decomposition of the acid as it occurred; by the steady avoidance of whatever tended to its creation, as wine, fermented drinks, and vegetable food beyond certain stated quantities; by the substitution of biscuit or well toasted bread in the room of that which was raw or fermented, and by the use of light animal food for breakfast, it has been for a long time most completely expelled.

A. There is a species of chronical head-ache, called idiopathic by nosologists, as having its peculiar seat in this organ, and distinct from the sick head-ache which supposes connexion and consent with a disarrangement of the stomach. It seems to owe its origin to the formation of osseous or calcareous substances within the skull. The presence of these concretions, which have evidently been the cause of the disease, has given much occasion for conjecture and reasoning to the ana-

tomist and the physician, more particularly when they appear to be so remote from the bones of the skull as to make it improbable they had been portions detached in consequence of previous accident; and where, upon the most accurate examination, no correspondent deficiency in any part of the cranium has been discoverable. A process of ossification must therefore be supposed by absorption and deposition from its fundamental materials, in no manner differing from the formation of all other bony substances, causing in its progress the excruciating pains and oftentimes the death of the sufferer.

B. Cases of this nature are abundantly detailed by the successive writers on morbid anatomy: but that which is recorded by Mr. Henry of Manchester, in the memoirs of the London medical society, is singularly illustrative of the principles now suggested as to its remote and generative cause. His patient had been from his infancy subject to an habitual cough and glandular tumors of the neck, and was evidently of a scrofulous habit of body, with a tendency to consumption. From his having been exposed to cold, and damp linen, the tumors on the neck suppurated and were eventually dried up. From this time he had occasional hectic cough, stricture in the chest, loss of appetite, and every appearance of confirmed consumption, which always terminated

in scrofulous eruptions and swelling of the legs, after which all his symptoms disappeared. In one of the usual spring attacks, however, this salutary eruption did not make its appearance, and his cough and hectic symptoms became so alarming as to threaten a fatal termination in confirmed consumption. In this state, the smallest quantity of fermented or spirituous liquors inflamed and intoxicated him, and having been once tempted to swallow a small draught of ale, a sudden and profuse hæmorrage from the nose, which much reduced his strength but at last ceased, left him free from his cough, tightness of the chest, and other immediately dangerous symptoms. In the ensuing spring his consumptive complaint returned with increasing violence, but left him unexpectedly, and without the scorbutic eruption or any other discharge. Immediately upon his recovering a comparative degree of health and strength, he was seized with a violent attack of head-ache every night as he lay down in bed, and occasionally in the day-time at irregular hours. This pain was seated directly on the lower part of the coronal suture, along which was observable a vacuity or chasm which had evidently not existed previous to the head-ache. The pain became extremely acute and pungent, occasionally removing to other adjacent portions of the bones, and extending to the point of the lower jaw. Soon after the commencement of

the pain in the head, it was observed that his breath had an unusually disagreeable and earthy smell; and as he was one morning sitting in his own house, without any previous fit of coughing, he was in danger of suffocation from something which had fallen into the gullet, where it had stuck. After considerable efforts he spat up an angular solid substance, larger than the end of his thumb, the greater portion of which was white, and the rest of a dark brown, the white part of which on being pressed crumbled into a dry powder. The whole was covered with a greenish mucus, and had a smell exactly resembling that with which his breath had been for some time affected, and which now ceased. A few days after, another similar substance fell into the throat and was discharged by the mouth, after a slight return of head-ache. These substances appeared upon examination to be calcareous, with a portion of hardened mucus attached to them, and smelling like bones which are exposed to the air after having been long buried in the earth. The vacuity or loss of substance in the bones of the head gradually filled up; and after lingering through two or three returns of the attack upon his lungs, without being relieved by the scrofulous eruption on the legs, hæmorrage, or discharge from the head, he died in a rapid state of emaciation and decay.

A. If we analize this case in the several variations and alternations of its progress, some deductions will naturally follow conclusive of the power of chemical application in aid of the laws of physiology. Here we see an original scrofulous diathesis, or a constitution morbidly abounding in the materials ready for the absorption or formation of osseous substance. This in the first instance had seated itself in glandular tumors and ulcers of the neck, occasionally affecting the chest and lungs in exact proportion to the recession and drying up of these ulcers. The exacerbations of the disease were always in the spring of the year, when the phosphorated oxygene of the air was in its full vigour after the repose of a winter. After the complete drying up of the scrofulous sores, the diseased action was fully transferred to the lungs, occasioning all the appearances of confirmed consumption: but whether the cough was attended with expectoration, and whether the expectoration contained calcareous matter in any state, we are not informed; but analogy will lead us to suppose the affirmative. The consumptive symptoms only yielded to a translation of the disease to the legs in the form of scrofulous eruptions, by which its acrimony was vented through the skin. In the casual failure of this salutary vent, the pulmonary distress was much increased, but was relieved by a profuse and exhausting bleeding from the nostrils,

by which it is probable that the morbid matter was either discharged or absorbed by revulsion. In a succeeding return of the complaint on the lungs, it was suddenly transferred to the head, where uniting with the earth of a portion of the skull, it formed those masses of phosphate of lime which were thrown into the throat, and spat up in a manner so extraordinary. The cavity in the frontal sinus, observed only during the formation of these masses, and which were doubtless the cause of the excruciating pains in the head, must have been formed by a solution of a part of the substance of the skull, and which after the expulsion of the material so formed was filled up by a new ossification. The reversion of this morbid influence at last to the lungs, finally destroyed the sufferer by a rapid consumption. How easy it is to call a chain of symptoms, joined together by the regular links of connexion, and reducible to one fundamental base, by the convenient term, a complication of disorders.

B. Superossification I have long been in the habit of considering as a leading cause of those chronical head-aches, which with little interruption or variation of symptoms distress and harrass the sufferer for many years together. Mrs. Williams, a fine young woman of about twenty-six years old, had been married nearly eight years, but had no family. For the preceding seven years she

had been afflicted with an excruciating head-ache, which covered nearly the whole of the scalp, and confined her to her bed almost all the time. Neither herself nor her friends had any recollection of previous injury or accident: and the compactness of the sutures, clearness of vision, and its long and steady continuance, gave no reason to suspect the accumulation of water. Cordials, blisters, sudorifics, and the usual remedies for rheumatism seemed to aggravate her pains. Suspecting at last that the skull was thickened by internal laminar ossification, and that the consequent gradual pressure on the brain was the cause of her malady, and observing that the teeth were perfectly sound and as it were crowded much together, I prevailed on her to submit to the extraction of the alternate teeth to the number of six in each jaw; hoping that by an absorption and diversion of the superosseous material to the jaws, to give relief to the head. My hopes were not deceived. The pains soon after subsided, and at last totally left her: the remaining teeth enlarged gradually, so as nearly to fill up the cavities left by those which had been drawn, and almost to meet together. She became the mother of three children, and is now in perfect health and happiness.

B. An important and highly interesting inquiry appears to arise from our previous investi-

gation of the origin of many of those stubborn maladies denominated chronic, which have hitherto eluded research, and set at naught the wisdom of man: I mean the remote cause of disarrangement of the intellects; and how far and in what kinds our present view of chronic affections may apply to it.

A. It will be previously necessary to define and distinguish the various morbid affections of this kind. Setting aside the infinite divisions and subdivisions of writers, they may be distributed into three classes. Of these the first may be called casual, as comprehending those cases of insanity originating in inflammation, accident, anxiety of mind, and perversion of the reason by the employment of its powers on one object to the exclusion of all others, thereby exciting the predominance of hopes and fears over probabilities, as in religious, political, and amorous maniacs. Another class may be called symptomatic; such as the insanity which often attends child-birth, consumption, scrofula, and the retrocession or striking in of some exanthematous eruptions or old ulcers. A third class may be called organic, such as idiotism, fatuity, and an original deficiency of energy. The first class seems independent of our subject, as having its foundation in local and adventitious circumstances. The two last are more clearly the

objects of physiological reasoning and application.

B. The occasional transision of many chronic diseases into insanity, and the never-failing return of the primary affection upon a restoration of the mental faculties, must as was observed before, suppose a radical connexion between them, as springing from the same source and proceeding from the same cause. The presence of periodical disarrangement, as in the case of those who are affected at certain seasons of the year, seems to be the termination of some chronic affection, or in some manner to supply its place. Every one knows that there are a number of crazy persons, who during the winter and in cool weather are in a state of comparative sanity, and are allowed to leave the different receptacles and wander about as perfectly harmless; but who upon the return of the hot season are excited into so much hurry and confusion of intellect, as to render a temporary confinement necessary. In all these subjects the faculties have not lost the power of identity and connexion, but they ramble with unceasing energy and hilarity on certain favourite topics, or sink into comfortless dejection at the never ceasing memory of fancied sufferings.

A. It will be observed that in our reasoning on the origin of the primary symptoms of con-

sumption, we supposed a predominant combination of oxygene and phosphorus in the system, which uniting with the earth and carbon, formed calcareous substances in the lungs. During this process both carbonic acid and phosphoric gas must escape in sufficient abundance, to account for the peculiar flightiness and tendency to insanity in this complaint, especially in the spring and summer. And although the materials necessary for the formation of absolute calcareous matter may not exist in their due proportions to this end, corresponding effects may nevertheless be produced in the system. This kind of flighty insanity differs nothing from intoxication by wine or fermented drinks, and is perhaps created by the same cause, the gradual developement of carbonic acid. From this and the secretion of phosphorus into activity may arise the great strength, persevering obstinacy, endurance of hunger and privations, salaciousness, and sudden flashes of genius so very remarkable in the subjects of these complaints: for two greater powers tending to these ends cannot be named than carbonic acid and phosphorus, and insanity with all its propensities may be excited by the extended use of them.

B. Drunkenness, delirium and insanity put on much the same appearances, and may probably all have their origin in the cause you suggest.

varying only in their degrees of force and duration. The first is occasioned by the actual reception of a specific dose, the effects of which terminate by its escape or loss of energy. Delirium may be compared to a kind of internal fermentation during the presence of fever, occasioning heat and the evolution of hydrogene and carbonic acid gases, and which according to its exciting cause may be of longer or shorter continuance. Insanity, which has been defined delirium without the presence of fever, may be caused by the developement of noxious gases, from causes not affecting the arterial system or producing inflammation, and thence be of greater permanency and in every possible shade of variation and degree.

A. It is well known, and has been before remarked, that during pregnancy all the symptoms of consumption are suspended, but which almost immediately after delivery resume their influence. It is no less worthy of consideration that insanity is alike suspended in pregnancy, and afterwards resumes its power. This must unquestionably suppose a cause of the malady existing in the organized parts of the frame and produced from some of its combinations, the effects of which are temporarily destroyed by other combinations tending to distinct purposes; and which purposes being ended, the primary affection is renovated.

Thus in many chronic diseases their symptoms are absorbed and overpowered by the presence of more acute ones, as the interruption of gout, rheumatism, and head-ache during fever. And thus it is that mad persons are not only less liable to take infectious disorders than those who are in perfect health, and are even freed from other complaints if they happen to be seized with insanity: but also they may be occasionally relieved of their insanity upon the supervention of a strong affection of the organs of the body, as a violent intermittent fever. The following very remarkable circumstance will likewise lead us to conclude, that even the action of hydrophobia may be suspended by this greatest of all the intentions of nature. All the dogs of Mr. Mills were bitten by one which soon died furiously mad. Among them was a favourite bitch who was near her time. Every dog that was bitten became affected at the usual distance of time, except this bitch, who brought forth a healthy litter which she for some time suckled, continuing all the time perfectly sound. The whelps were at length taken from her, and she in like manner almost immediately afterwards went mad.

B. The last class of intellectual dereliction, consisting of the various degrees of idiotcy and fatuity, though they have many shades of resemblance to the former, seem nevertheless to owe

their origin more to peculiarity of organization than distinct and local disease. We search in vain for its seat in the brain and nerves, the supposed basis of all the powers of the mind: for, except that the brain appears to be of a something harder consistence, these parts in an ideot are as perfect as in the wisest of men. No comparative examination however, has yet been made by the chemist of the brain of idiots and sound persons, by which it might be shewn whether there existed any excess or deficiency of its basis or component parts.

A. Comparative induction may lead us to some conclusions, which must nevertheless as yet be merely speculative and theoretical. Some singular habits of these unhappy objects mark them with such peculiarity, as cannot fail to strike the imagination of the inquisitive and curious mind. Although they are incapable of conclusive reasoning, and the application of past and present facts to future conduct and consequences, so as to render them competent to the management of human concerns, and are on this account declared by the law to be without guile, and incapable of deliberate and conscious crimes, yet they frequently abound in those sallies of quick and flighty wit which give equal surprise and delight. For this reason they were formerly kept in the train of princes and dignified personages, with

uncontrolled licence to exercise these volatile bursts of rapid imagination on all occasions for the amusement of the hearers, and from an ancient notion of the sacredness of their persons.

B. The alliance between wit and madness, by which I suppose is meant this deficiency of sound intellect, with its occasional flights of acuteness, has been ever the subject of much remark: and at this day idiots are held in great veneration in the east, as their unpremeditated effusions are supposed to savour of divination and inspiration. "The fools," says Dryden, speaking of a court assemblage in his days, "overflowed with smart repartees." And the aphorism, nullum magnum ingenium sine dementiâ, that all great genius is tinctured with madness, is as old as Aristotle.

A. Another peculiarity not less remarkable, but which has excited the observation of all generations, is the salaciousness of idiots, or as they were formerly called, naturals. The Fauns and Satyrs, the demigods of ancient mythology, were emblems of these wild and untutored beings. Per totam Mesopotamiam et regionem interiorem Syriæ, hodie subjiciuntur mulieres omnes, tam nobiliores quam plebiores, pro arbitrio, amplexibus libidinosis horum sylvanorum humanorum. Priapus, cum Faunis et Satyris, conservatores fuerunt et diisculi hortorum, nemorum sacrorum,

et sylvarum umbratilium. It is certain that this description of lunatic is much lessened in frequency; as formerly every little district had its parish-fool or innocent, who was suffered to rove about in unrestricted liberty, unoffending and unoffended. And it is not less evident that as these and some similar chronic complaints have decreased, others have gained ground.

B. These circumstances show that there is no disorganization of the brain, no general deficiency of the nervous influence or what we have supposed an oxyphosphorescence of the system, but rather an occasional excessive excitement into action. They are however mostly deformed by distortions of the bones of the back or chest; for this reason, and from the traditional remembrance that these objects were anciently in the retinue and under the protection of the lords of the district, every crook-backed person among the villagers now goes under the jocular name of My Lord.

A. Perhaps we shall find no better illustration of this kind of mental imbecility, than by a comparison with what we have already noticed in that excessive degree of scrofula so endemic among the Cretins. In this affection it is observed that the weakness of the intellect is in proportion to its malignity; so that in its worst

condition the object is reduced to the lowest stage of stupid idiotism. And it is a coincidence something remarkable, that these most wretched of all human beings have the same rapid illumination of quick retort, and the same sensual tendencies. It was likewise observed that the bones, especially of the head, were proportionally slow in their formation and induration; and that in rickets and silly children this irregularity was applicable in the late closing of the fontanelle and protrusion of the teeth. Something therefore incidental and having relation to a peculiar state of ossification must be concluded as the basis and original cause of these complaints.

B. This imperfection must be considered as a deficiency or privation of one of the primary materials composing the bones, which from the incompleteness of their bulk and substance we can only suppose to be their earthy part. And it is reasonable to conclude that the brain itself has absorbed or secreted the earth thus lost, as it is known that the brain is harder, and perhaps of greater specific gravity, in idiots than in other men, and may therefore be charged with an undue proportion of phosphate of lime, and be consequently in an incipient state of ossification. In this manner, for want of elasticity, may this organ essentially differ from another which conduces to sound mental health and perfection:

and in this manner only, in the present incomplete state of our knowledge of its relations and functions, by supposing an undue proportion of its relative component parts, can we account for its variations of power and energy, from the lowest and most debased degree of idiotism, to the most exalted state of wisdom and genius. And those quick and evanescent flashes of fancy, may be excited by the occasional disengagement of phosphorus in union with oxygene and carbonic acid, giving a momentary vigour during the process of absorption.

A. In healthy persons this earthy part is commonly secreted into the adipose membranes, the kidneys and mesentery, and is the cause of corpulency, by combining with the animal oil and forming gradual accumulations of fat too gross to be absorbed and carried off. Violent exercise in warm weather will remove a large quantity of this superabundance by perspiration, as fat coach-horses, after hard work, are observed to be covered with white sebaceous substances, after they become cool and the watery part is evaporated. Or it may be decomposed by the steady use of soap or soap-leys, which reduces it to a fluid state, in which it is more readily carried out of the system.

CONSULTATION VI.

B. From our previous discussions we are led to the conclusion, that consumption in its remote cause is the formation of phosphate of lime, in its various degrees of induration, into bone in the lungs, and that this is either effected by the absorption of calcareous earth from the ribs and adjacent parts, or the deposition of this earth by the secretory arteries, and in both cases uniting with the phosphorous acid, formed by the slow ignition of the phosphorus abounding in the animal system, with the oxygenated materials of the atmosphere. That gout is a similar deposition on the joints: asthma on the diaphragm and membranes investing the lungs: gutta rosacea and scrofulous eruptions a secretion of this matter to the skin, particularly where the lymphatics are most abundant: low melancholy and dejection an absorption of the earth to the nerves: scrofula and cancer a morbid secretion to the glands or ligaments. That distortions of the bones are an excessive secretion and accumulation of osseous matter; and their softness a dissolution and absorption of their earthy parts, rendering them thin and porous. And that these affections interchange with each other, forming peculiar disease according to their locality or predominancy of symptoms.

A. All these affections are therefore, not precisely one and the same disease, but very nearly so. They are all the offspring, of which scrofula or king's evil may be denominated the parent; all the branches, of which scrofula is the root; all the species, of which scrofula is the genus. And having much the same origin are commutable with each other in a remarkable manner; so that one species may by accident, mode of life, or peculiarity of treatment be transmuted into another. And it is not uncommon in one large family, where this scrofulous diathesis is very predominant, to observe the characters of each variety. One is marked with scrofulous scars or eruptions: another with loss of the bones of the nose or palate, or with distortions of some of the joints: a third is consumptive, gouty, or asthmatic; and another has a tendency to insanity. And such is the ascendancy of this habit in these climates, that it is rare to meet with a numerous race, in some of the branches of which it is not in one shape or other distinguishable.

B. In the family of John Elton, Esq. two sons and one daughter died in rapid consumption before the age of twenty-three: the remaining daughter after exhibiting a strong disposition to this disease, became suddenly and unexpectedly relieved, but was soon afterwards seized with insanity, and is now under confinement. Hap-

pening to be accidentally called to the house of Mr. Morgan, a practitioner in physic near Carmarthen, I found his mother-in-law in the most furious state of insanity; her daughter, Mr. Morgan's wife, in the last stage of pulmonary decline, another daughter covered with scrofulous sores, and the only grandchild consuming with white swelling in the knee.

A. The transision from one species of this affection to another is not less characteristic of its identical affinity. Young girls, at about the age when this disposition becomes most prominent, are often seized with painful and inflamed swellings of the feet and ancles, exactly resembling fits of the gout, which disappear after a short continuance, and which are sometimes injudiciously and dangerously attempted to be repelled, under the notion of their being rheumatic affections or accidental sprains. My neighbour Dr. Parr, a young man of singularly flighty and romantic disposition, and of great acuteness of intellect, was for many years afflicted with periodical asthma, attended with the most distressing spasms. His fits were frequently suppressed by gouty attacks, and sometimes slight derangement of mind, but always terminated in profuse urinary discharges with a large deposit of calcareous sediment; after which his mind became unusually serene and tranquil. His asthmatic attacks

became eventually less frequent, and at last changed to confirmed insanity. The calcareous matter, which when deposited on the diaphragm or membranes of the lungs, and by their obstruction caused the paroxysms of asthma, might in their too weakened a state to carry on the complete process of expulsion, be translated by absorption to the meninges of the brain and produce insanity.

B. In this manner gout often terminates in urinary discharges of calcareous matter, and sometimes in what is commonly called scurvy. Mr. Thomas Evans, the coroner for Carmarthenshire, has for thirty years been afflicted with gout in so severe a manner as to be usually half the year in bed. Long experience has taught him to foretell the end of his fit, by an intolerable itching over the whole skin, which in a short time is covered with a deep scarlet scrofulous rash accompanied with profuse perspirations, which in a few days leave him free from gout, and except his crippled state, in complete health and spirits. This rash is always preceded by slight shiverings, during which it is probable that absorption of the secreted earth takes place, and is eventually carried off by the eruptions through the skin.

A. Thus does nature, in a specific and palpable manner, urge her intentions for the expulsion

of morbid accumulations which interrupt the organs essential to sound health, by critical depositions on parts from whence they may be most readily driven from the system: and thus, where power is wanting in these parts to fulfil such intentions, or where by incautious treatment they have been repelled, commutable transision must take place to other parts or organs, necessarily productive of dangerous alienations from their proper offices, and difficult to be removed. It is with this view that skilful physicians endeavour to bring on a regular and settled fit of the gout, in that anomalous mass of undescribable ailments which sometimes disturb and harass the declining part of life.

B. That peculiarity of temperament and disposition by which all the branches of this affection are strongly marked, may in some manner favour the opinion of their affinity and remote relationship to each other. The great hilarity and conviviality of gouty men is sufficiently obvious, and has been always noted. This profusion of animal spirits is not less evident in consumptive persons, leading them to delusive dreams of future happiness and splendor. In scrofulous persons it is equally observable in the peculiar acuteness of their imagination, and the unceasing propensity to a rapid stream of conversation, except where it has fallen on the nerves and pro-

duced dejection and despondency. The extraordinary garrulity, vivacious flightiness, and restlessness of ideots have been already remarked. And it is well enough known that mad people have all perverted notions of high birth and lofty distinction, are proud and jealous of fancied contempt, quick in resentment, incessantly raving on one favorite topic, which is usually connected with kings and illustrious characters, imagining themselves in alliance with them, and even anxious and seeking about to revenge supposed wrongs on these exalted personages.

A. A similar train of connecting habits may be observed in the sexual tendencies so particularly prominent in all these complaints. Persons of a gouty habit are proverbially salacious: and highly scrofulous and consumptive objects, and more especially ideots and lunatics, have propensities of this nature so extreme, as even frequently to terminate in a kind of venereal frenzy, called in men satyriasis, and in women nymphomania. Hence we conclude that some constitutions abound much in phosphorus, or that by peculiar combinations it is more readily brought into action: for a phosphoric odour is sometimes exhaled through the pores by rubbing the skin, or after the agitation of exercise.

B. A wider range must therefore be taken in

our views and intentions in preventing these affections in their earliest stages, and our endeavours to remove them when they are actually formed. It is not the merely quenching a paroxysm, or stifling a symptom, that will conduct us to this end, but it must be sought for in a solicitous inquiry into the primary cause of such aberrations from the laws of sound health, and its subsequent ramifications into morbid actions, constituting distinct disorders.

A. It seems that the original principle of vitality and animation is an union of the phosphorus of the system with the oxygene of the atmosphere, delivered to the lungs by inhalation, and thence diffused through the whole frame. That either of these substances are separately inactive. That by their union they lead to certain specific combinations, each tending to appropriate ends: and that by a predominancy of any of these combinations, effects are produced, consequently inducing determinate actions. Thus by the creation of the phosphorous acid in excess, the alkaline earth, which in its proper proportion with this acid should form the basis of the bones, is absorbed by capillary attraction and deposited in extraneous parts, forming the nucleus and the seat of diseased actions.

B. And by this action a partial absorption

takes place, consequently lessening the equality of this power through the general system. For it is observed that consumptive, gouty, asthmatic, and persons otherwise affected with scrofula, have the general secretions much diminished, as dry nostrils and hands; and this though it may not form a visible part of the disease, must necessarily contribute to general imbecility and decay.

A. The objects therefore which we have chiefly in view in combating these morbid actions, and leading to the means of prevention and cure, are principally if not exclusively these. To extinguish and destroy this tendency to form phosphorous acid, by which the bones and muscles are deprived of their earth, and give strength and firmness to the parts thus weakened. To decompose the calcareous matter already deposited in irregular parts: and by the promotion of general and vigorous absorption, to counteract that local action which promotes the deposition of this earth in its various combinations on peculiar parts and organs.

B. The first of these intentions was attempted by the ingenious theory of Beddoes, though upon the principle that excess of oxygene alone was the primary cause, and endeavouring to subdue this exciting power by the inhalation of other

gases. But this could merely effect the temporary extinguishment of its immediate action; and although relief was in most instances for a short time administered, a radical cure was rarely or never perfected.

A. Unfortunately for the safety of the patient and the skill of the physician, help in these cases is seldom called for till it is called for in vain. The approaches to danger and fixed habit are in a slow and imperceptible gradation, and are consequently more treacherous and formidable in their consequences. The earliest appearance therefore of any of the symptoms already described should awaken attention, if not excite alarm: and if a tendency to the formation of phosphorous acid be discoverable, small doses of any mild alkaline salt, as the subcarbonate of kali, or the sulphate and phosphate of soda, repeated twice or thrice a week, will seldom fail to decompose this acid by neutralization, and carry it off by the bowels, leaving the body cool and free from irritation. By this simple process, and by avoiding the use of whatever may tend to the excitement of this acid, such as fruits, fermented drinks, and raw vegetables, incipient consumption has not only been completely removed, but its advancements repelled.

B. The agreeable and particularly light and cool sensations which are always felt after an

aperient relief from salts arise, not from the mere discharge of accumulated matter in the bowels, but from the decomposition of calcareous aggregations, as they are not experienced from the administration of any other opening medicine. Hence the popular use of them in the spring of the year, as a preventive of sickness, and what is called a cooler of the blood. And I have known gouty, asthmatic, scrofulous, and phthysical persons keep down the recurrence and violence of their attacks, by their occasional use, in moderate quantities and at stated times.

A. Another method of relief, equally efficacious and simple, is the extinguishment of the powers thus exciting diseased actions, in consequence of the too rapid union of phosphorus with oxygene. And to this end sulphur presents itself as offering the most decided and certain effects. The rapid diffusibility of this substance, and its immediate union with the oxygene of the system, are discoverable by the odour issuing from the skin of such as have taken it internally or used it in friction. Its property of extinguishing the ignition of inflammable substances is well-known, and its activity in the disengagement and destruction of phosphorus is evident, in the experiment of holding a lighted match near a full-blown rose or other vegetable, by which its chromic or colouring principle is destroyed, and it

becomes white, and in the sudden manner in which its flame or gas bleaches bones, and destroys animal life by quenching one of its primary agents of combustion and vitality.

B. The great value of this simple substance when in combination with animal products, is shewn in its immediate power over many disgusting diseases of the skin, some of which are evidently of a scrofulous nature, as the mange in dogs and swine: and its credit among the common people, as what they term a sweetener of the blood, may be substantiated by a cloud of instances, where it has produced extraordinary effects in the early stages of many of the complaints we have had under consideration. Two greater agents I cannot name for bringing into effect the objects of our inquiry, than alkaline salts and sulphur in their several pharmaceutical combinations: one for the purpose of neutralising a superabundance of acid, and the other for destroying a tendency to the excitement and activity of phosphorus.

A. The celebrated composition of Dr. Griffiths, by which more relief has been given in these affections, especially in consumption, than any which has occurred to my knowledge, is precisely upon this principle; though its physical action has, I believe, been considered by very few, and

therefore it must have been given occasionally in a manner not the best adapted to its intended effects. The only two ingredients in this composition which can be allowed to possess activity, are subcarbonate of kali and sulphate of iron. And if I mistake not, this intelligent practitioner always directed its exhibition to be preceded by a few doses of salts.

B. And as in these cases there is usually so general a disarrangement in consequence of diseased action, as to create much languor and debility, attention must be given to strengthen the system by nourishing food, bark, moderate but not fatiguing exercise, and if there be much irritability towards the evening a gentle opiate at night. The stomach in particular is much subject to relaxation, and to become extremely delicate and fastidious. The bark often nauseates, and common food either turns acid or is rejected. Under these circumstances the following treatment has been found most successful. Infuse an ounce of chamomile flowers, in a covered vessel, in three pints of boiling water, and add two ounces of tincture of ginger; of this a small tea-cup full may be taken three times a day: and after the stomach has recovered some vigour, the cold infusion of bark with an addition of any aromatic tincture, as cardamom, castor, or cinnamon. The opiate best adapted to sooth tem-

porary irritation is a tea-spoon full of Hoffman's anodyne, or compound spirit of æther, in a little camphorated mixture.

A. Where the bones have become actually decomposed by an absorption of a portion of their earth, and have consequently lost their solidity and substance, a process like that described in the case of Mr. Stevenson may be often adopted with much advantage: a regular use of phosphate of lime and burnt sponge, with warm fomentations of a solution of the subcarbonate of kali. By these means, and by a careful avoidance of whatever may contribute to excite these morbid actions, their lost substance may be restored and they may be rendered firm. The carbonate of ammonia or burnt sponge, and the carbonate and phosphate of lime, have been lately much disused, as ineffectual for the purposes intended, but I have often thought unworthily so. Their action may probably not have been clearly understood, or in consequence of their not answering the wishes of the prescriber as expeditiously as was expected, they may have been too hastily laid aside. By a steady perseverance in their use, I have never known them fail to reduce [illegible] and other strumous tumours, and to give [illegible] to the bones of rickety children.

B. A regular absorption of bone must doubtless take place during the growth of animals: how else can we account for the gradual enlargement of their interior cavity, but by supposing a proportionate waste of their interior laminar substance from this cause. And that a vigorous secretion may be excited through the stomach, for the purpose of supplying this waste to the enlargement of their outward surface, is known from the circumstance of the bones becoming red in animals which have been fed with madder. In young pigeons they were coloured in twenty-four hours, but in such as were full-grown it took up a fortnight.

A. And in the formation and actual deposition of calcareous phosphate, especially in gout, asthma, angina pectoris, stone or gravel, and the ossifications of old age, where the arteries are partially clogged up, and the bones and tendons become rigid, this deposit may in a great measure be dissolved, by repeated small doses of the oxalic or malic acids mixed in water, and used as a cooling beverage. These acids, particularly the oxalic, which is commonly sold under the name of salt of lemons, have a great affinity with lime, which they rapidly separate from all the other bases or combinations, converting it into an oxalite of lime, which will be readily taken into the torrent of circulation and thence

be carried off by the various secretions; or they may be broken into particles so infinitely small, by the use of soda or soaper's ley, as to be in like manner taken up and carried off. By this means not only has gout, asthma, and gravel been in a great measure driven from the system, but the depositions of phosphate of lime in the lungs and other parts tending to disease, have been destroyed by solution, and even the approaches of old age and decay, which depend much on these accumulations, have been retarded. If it be possible to find out the means of dissolving gradually, in this manner, the calcareous phosphate as it accumulates in excess, without depriving the bones of their solidity, and without injury to the other animal functions, and at the same time to supply the slow waste of phosphorus in the wane of life, the fountains of youth and rejuvenescence will be disclosed to us.

B. By the attainment of these intentions, two leading causes are removed, each of which contributes to the formation of a distinct diseased action: the restoration of calcareous earth to parts where it has been too hastily absorbed; and the resolution and expulsion of morbid accretions, where, in consequence of such absorption, it has been deposited. And in the appreciation and judicious management of these objects, will the skill of the practitioner be displayed.

A. It is upon the principle that a lesser action is destroyed by a greater, that a partial absorption tending to produce local disarrangement may be suppressed by any power exciting this action, either generally, or more vigorously in any neighbouring part: and for this purpose may such an influence be advantageously made use of in many of these diseases. In this manner issues and setons have been found valuable assistants, by creating a rapid secretion to a given point, and removing to an outward vent a diseased inward action: and hence the power of savin ointment in old scrofulous sores, by exciting a continued discharge of their morbid secretions, after which they quickly dry and heal up with the assistance of calamine ointment.

B. With this view issues or setons are applied to the side, in angina pectoris or ossification of the lower point of the heart, and in distortion of the ribs, where a part of their substance has been softened and carried into the system: and in like manner, for the purpose of producing vigorous action, caustics and cupping are had recourse to in distortions of the spine, and the commencement of white swellings and other scrofulous enlargements.

A. The inhabitants of China and Japan have a compendious method of effecting local excite-

ment in fits of the gout, pains in the side, and other accumulative disorders, by a kind of cautery made of the downy substance on the leaves of the artemisia chinensis, or chinese mugwort. This substance, which they call moxa, is made into small conical pastils, and after being slightly moistened are placed on the part where it is intended to make a drain. The top of the cone is then set fire to, and burning slowly to the bottom, leaves a black mark or scar on the skin, which in a short time ulcerates and discharges an ichor, the flow of which is kept up by proper stimulatives to any desirable period. The action in this case is much more powerful than that from a blister, and the absorption and secretion consequently more determinate.

B. It has ever been acknowledged, that to promote the action of a general absorption, is one of the most desirable ends in our endeavours to conquer the propensities and resist the approaches to these diseases. In the early appearances of mental disarrangement, Dr. Willis generally kept his patients in a continual nausea of the stomach, by means of small doses of tartar emetic or powdered ipecacuanha: and it is upon this principle, that a pill consisting of a single grain of ipecacuanha, made up with the crumb of bread, and taken every day before dinner, is exhibited with such extraordinary success in spas-

modic asthma. May not the suspension of consumption and other chronic affections during pregnancy, be in some measure attributed to the nausea and consequent absorption which regularly takes place at this time?

A. Sea-sickness, and the exercise of swinging and riding, are on this account much recommended; and the great effects produced by cicuta, stramonium, belladonna, and some other powerful remedies in asthma, struma, and scrofulous ulcers, are effectual and specific, only in the proportion as they stimulate into action the extremities of the absorbents and lymphatics, perhaps previously in too inactive a state.

B. Bleeding is likewise a valuable accessory, which it is necessary to resort to occasionally upon this principle; for as all inflammation is, in its remote cause, an undue stimulation and acceleration of arterial action; venesection, by lessening the volume of the blood, may create an immediate absorption for the restoration of its due quantity, and thence subdue this morbid excitement.

A. Many of the metallic oxyds, but especially those of mercury, act in a specific and vigorous manner upon the extreme capillary vessels, and stimulate them into very powerful action, more

particularly causing the glands to discharge their watery contents. In extending this action to salivation, it is probable that the oxygene of the metal combines slowly with the hydrogene and carbon more abundant in these organs, and forms the water thus kept in continual flow.

B. The power of mercury in suspending and destroying diseases of the bones, is immediately recognised in its specific action on the venereal virus, which in a peculiar manner decomposes them, and disposes them to throw off their earth in nodes and tophous excrescences, especially in the legs, where it cannot be taken up and carried through the system. It is likewise to be remarked, that mercury has a very sudden action in scrofulous habits, so as to excite ptyalism in a much shorter time than in other constitutions, as if it were eager to come in union with these diseased organs.

A. There is an old prejudice against the internal use of this mineral, from the supposition that it leaves pains in the bones: but this is, I think, attributing an effect to an erroneous cause; for these pains in the bones are an accident from their previous inflammation by venereal contamination, and which the use of mercury has not completely removed, but by no means excited. On the contrary, mercury alone has the power, by pro-

moting absorption, to reduce and bring back into the system the nodes and excrescences which the inflammation of the disease has already formed. And by parity of reasoning it will in like manner re-absorb calcareous depositions, and the morbid indurations of cancer, scrofula, struma, and internal tubercular aggregations.

B. This noble auxiliary is not only quite harmless as to any future unpleasant consequences, if carefully and cautiously managed, but is fortunately so much under the control of modern skill, that its action may be abated and even totally suppressed in a very speedy and decided manner. Mercury, like most of the metals, only acts on the organs of the body in its state of oxydation. Destroy this combination by depriving it of its oxygene, and it immediately becomes inert. For this purpose, if the process intended by its use has been carried sufficiently far as to make it desirable it should be checked, the internal exhibition of small doses of sulphur will reduce it to an inactive sulphuret: or the sulphurated alkalies, as the liver of sulphur, or any of the natural or artificial sulphurated waters, will in a very short period arrest its powers and render it inert. For the sulphurated hydrogene contained in them deprives the metallic oxyde of its oxygene, and at the same time withdraws the cause of its causticity. Iron likewise, in the state

of a fine powder, destroys the energy of metallic oxydes, by robbing them of the oxygene which renders them corrosive: and in this manner may the poisons of copper, quicksilver, or arsenic, be speedily decomposed and rendered harmless, if these reagents are administered in proper time. And upon this principle should all those who have in any way been subject to mercurial or other mineral action, go through a regular course of such waters as contain sulphurated hydrogene, or what are better known by the name of the stinking wells, in order that any latent portions of the metallic oxyde may be decomposed by the abstraction of its oxygene.

A. From my own experience I am inclined to think very favourably of its uses in many chronical complaints, especially where a general excitement is desirable for the purpose of destroying morbid action of a local nature. And to this end, a solution of the oxymuriate, as directed in the London Pharmacopœia, is the most certain in its effects and more divisible into definite portions. The method I have usually pursued, is to give two drachms of the solution of the oxymuriate in an ounce of cinnamon water, twice a day, till the glands appear to be affected, or there are evident signs of general absorption. Or the same intentions may be effected, by mixing two grains of the oxymuriate in six ounces of distilled wa-

ter, adding to it an ounce of the tincture of orange peel, and taking a table spoon-full twice a day. Its effects are first apparent in the quantity of water which is formed by an union of the metallic oxyde with the hydrogene formed in the system, and which is carried off in large discharges from the kidneys.

B. It will be readily seen, how useless and impossible it is to adapt specific directions for the cure of general ailments; and that the prevalence of peculiar symptoms, and their various forms of local pressure, must in a great measure guide the practitioner in his intentions, as they present themselves before him. Still, nevertheless, he must keep steadily in his view the great object of his solicitude and his office, the removal and expulsion of that remote cause of diseased action, by which alone he can hope for the attainment of perfect eradication and cure.

A. In this manner have we endeavoured, upon principles consonant with the established laws of nature and neoteric philosophy, to account for the remote production of light, as originating from the phosphoric ether emanating from the sun, and illuminated by its combination with the oxygenated atmosphere of the earth, producing by their union warmth and heat, and burning in proportion to the force of their com-

bined powers. These premises we have applied as a solution of the primary causes of life and animation; and have also attempted, upon these elements, to account for some organic actions of the animal frame, as constituting by their results the basis of many of those disarrangements of the simple intentions of nature, which are denominated diseases. At some future period we will adventure to enlarge our thoughts, if they shall appear to be founded on truth, to the developement of some other classes of morbid aberrations. Connected with these data, the theory of the plague, the jail fever, and others of a putrid nature, may appear to have their exciting cause in some latent power, which obstructs and extinguishes the union of phosphoric emanations with the oxygene of the atmosphere: for it was remarked, that when the plague raged in London with its greatest violence, in the year 1665, the fires which were lighted in the streets, for the purpose of purifying the air, could with the greatest difficulty be kept burning; a sure evidence of the imperfect combination of these two great agents.

B. That art is long and life is short, and that opportunity for exertion must be secured whenever it presents itself, was the melancholy reflexion of Hippocrates, prefatory to his aphorisms on the diseased infirmities of mankind. Without

the light of reason, and in the absence of the sun of intelligence within us, we wander in the eclipse of those faculties by which alone man is separated from the brute, and lose that noble distinction by which he approaches to the image of his maker. Hesiod, in his celebrated distribution of the degrees of intellectual excellence, gives the place of pre-eminence to him that can by his own powers discern what is right and fit, and penetrate to the remoter motives of action. And although it is seldom attainable within the duration of human existence, to plan the foundation and complete the structure of a system, yet there are few of the disciples of genuine literature who may not, by the vigour and exercise of their own reason, add some items to the general account of science.

A. Let us, at least, join in hope with the illustrious Beddoes, " that these and other known data, will one day conspire with future discoveries in chemistry, to unravel all the mysterious operations of the organs of animalization. And that the philosopher of another age, by explaining, and perhaps also by teaching how to manage their intricate and multifarious machinery, may see that art, which can rest firmly on no other foundation than a just theory of the functions of the body, rising under his hands to a beautiful and solid structure. Nor however

remote medicine may at present be from such perfection, do we see any reason to doubt, that by taking advantage of various and continued accessions as they accrue to science, the same power may be acquired over the living, as it is at present exercised over some inanimate bodies, and that not only the cure and prevention of diseases, but the art of securing and protracting the fairest season of life, and rendering health more vigorous, will one day half realize some of the dreams of alchemy."

FINIS.

ERRATA.

Page 20. l. 7. for *latter*, read *former*.
— l. 9. for *former*, read *latter*.
25. l. 7. for *to*, read *with*.
62. l. 20. for *and*, read *or*.

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